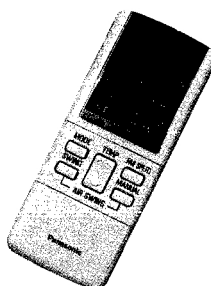
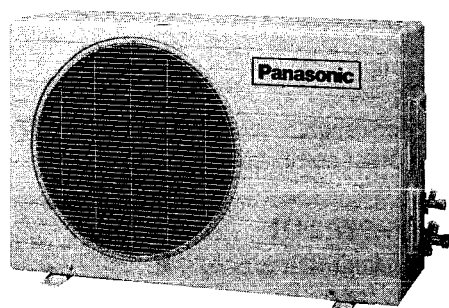
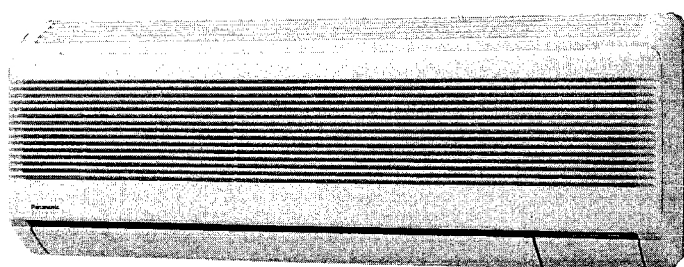


Service Manual

Room Air Conditioners

CS-A70KE / CU-A70KE
CS-A90KE / CU-A90KE
CS-A120KE / CU-A120KE



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Panasonic

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 WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

**PRECAUTION OF LOW TEMPERATURE**

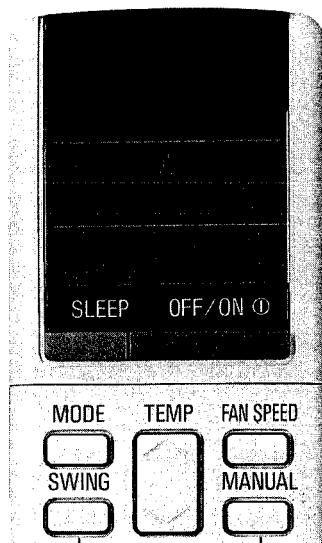
In order to avoid frostbite, be assured of no refrigerant leakage during the installation or repairing of refrigeration circuit.

Features

- **High Efficiency**
- **Compact Design**
- **Comfort Improvement**
 - Wider range of horizontal discharge air
 - Longer hours of sleep mode operation
- **Auto Restart**
 - Auto restart operation after power failure
- **Removable and Washable Front Panel**
- **Installation Work Improvement**
 - Long piping up to 10 m (3/4, 1.0 HP) and 15 m (1.5 HP)
- **Quality Improvement**
 - Low voltage protection
 - Gas leakage protection
 - Prevent compressor reverse cycle
 - 2-stage OLP to protect compressor
- **Service Improvement**
 - Easy fan motor replacement procedure
 - Front side servicing for outdoor unit

Functions

Remote Control



OFF / ON ①

Operation OFF / ON

MODE

Operation Mode Selection

- AUTO Automatic Operation Mode
- HEAT Heating Operation Mode
- COOL Cooling Operation Mode
- DRY Soft Dry Operation Mode

FAN SPEED

Indoor Fan Speed Selection

- Low Speed
- Medium Speed
- High Speed
- AUTOFAN Automatic Fan Speed

SWING /
MANUAL

Airflow Direction Control

- SWING Automatic Airflow Direction Control
- MANUAL Airflow Direction Manual Control

TEMP.

Room Temperature Setting

- Temperature Setting (16°C to 30°C)
- Automatic Operation
 - ◀ 2°C lower than standard
 - Standard
 - ▶ 2°C higher than standard

ON-TIMER
OFF-TIMER

Timer Operation Selection

- 24-hour, OFF / ON Real Timer Setting.

TIME

Time / Timer Setting

- Hours and minutes setting.

SET
CANCEL

Timer Operation Set / Cancel

- ON Timer and OFF Timer setting and cancellation.

CLOCK
(時計)

Clock Setting

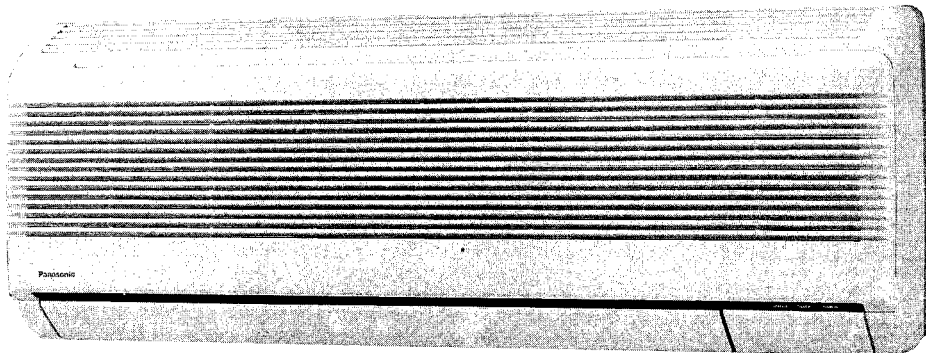
- Current time setting.

SLEEP

Sleep Mode Operation OFF / ON

Functions

Indoor Unit



POWER ①

Power Switch OFF / ON

AUTO
OFF / ON

Temporary Operation Switch

- Used when the remote control cannot be used.

Remote Control Signal Receiving Sound Control

- It can be controlled by pressing Temporary Operation Switch for 10 seconds.

TEST RUN
OFF / ON

Operation Test Running / Pump Down Switch

- Used when test running or servicing.

Operation Indication Lamps (LED)

- **POWER (Red).....** Lights up in operation
Blinks in Automatic
Operation Mode judging
and Hot Start operation
- **SLEEP (Orange).....** Lights up in Sleep
Mode Operation
- **TIMER (Orange).....** Lights up in Timer
Setting

Operation Mode

- Heating, Cooling, Soft Dry and Automatic Mode.

Time Delay Safety Control

- Restarting is inhibited for approx. 3 or 4 minutes.

7 Minutes Time Save Control

- Cooling Operation only.

Auto Restart Control

- Operation is restarted after power failure at previous setting mode.

Anti-Freezing Control

- Anti-Freezing control for indoor heat exchanger. (Cooling and Soft Dry)

Hot-Start Control

- The indoor fan stops until the indoor heat exchanger temperature over 30°C.
- The indoor fan operates at SLo and Lo when indoor heat exchanger temperature reaches 30°C ~ 41°C.
- Hot Start is completed when indoor heat exchanger reaches 41°C.

Sleep Mode Auto Control

- The operation starts at SLo speed and stops after 8 hours.

Indoor Fan Speed Control

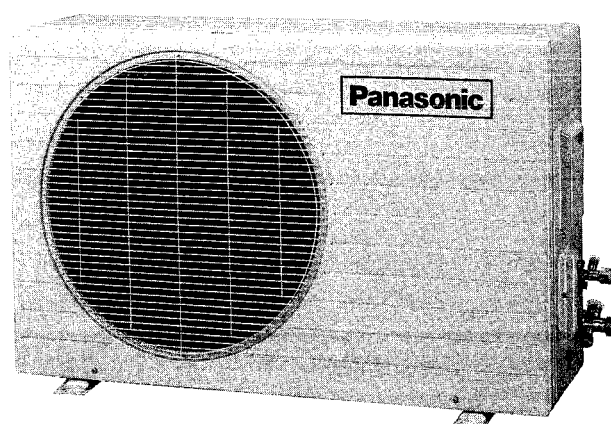
- High, Medium and Low.
- Automatic Fan Speed Mode
 - Heating : Fan speed varies from Me → SLo in accordance with indoor heat exchanger.
 - Cooling : Fan rotates at Hi and Me speed. Deodorizing control is available.
 - Soft Dry : Fan rotates at SLo speed. Deodorizing control is available.

Airflow Direction Control

- Automatic air swing and manual adjusted by remote control for vertical airflow.
- Manually adjusted by hand for horizontal airflow.

Functions

Outdoor Unit



Compressor Reverse Rotation Protection Control

- To protect compressor from reverse rotation when there is a instantaneous power failure.

Overload Protector

- 2-stage OLP to protect the compressor. Overload Protector will trip when
 - High Temperature
 - High Current
 (Refer circuit diagram for OLP characteristic)

60 Secs. Forced Operation Control

- Once the compressor is activated, it does not stop for 60 secs. (Stops immediate with remote control stop signal.)

Deice Control

- To prevent frosting at outdoor heat exchanger. (Only for Heating Operation)
- Outdoor indoor heat exchanger is sensed by TRS (Thermal Reed Switch).

Overload Protection Control

- Outdoor fan stops when indoor heat exchanger temperature rises to 51°C and restarts when the indoor heat exchanger temperature drops to 49°C.
- Compressor stops when indoor heat exchanger temp. reaches 65°C or above. (Heating Operation only)

Compressor Protection Control

- If the outdoor fan motor is not running after compressor starts for 50 secs., compressor will stop. (Cooling and Soft Dry Operation only).

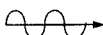
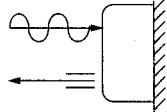
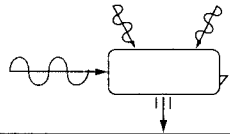
4-Way Valve Control

- When the unit is switched to "OFF" during Heating Operation, 4-way valve stays at Heating position for 5 minutes.

Outdoor Fan Operation Control

- Inner protector.

Product Specifications

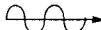
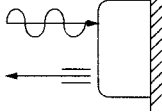
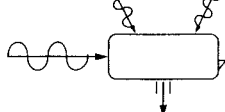
		Unit	CS-A70KE	CU-A70KE
Cooling Capacity		kW	2.05 - 2.00	
		Btu/h	7,000 - 6,800	
Heating Capacity		kW	2.15 - 2.10	
		Btu/h	7,300 - 7,200	
Moisture Removal		ℓ/h	1.3	
		Pint/h	2.7	
Power Source		Phase	Single	
		V	240 - 220	
		Cycle	50	
Airflow Method		OUTLET  INTAKE 	SIDE VIEW 	TOP VIEW 
Air Volume	Indoor Air (Lo)	m³/min (cfm)	Cooling ; 5.5 (190) Heating ; 5.5 (190)	—
	Indoor Air (Me)	m³/min (cfm)	Cooling ; 6.0 (210) Heating ; 6.0 (210)	—
	Indoor Air (Hi)	m³/min (cfm)	Cooling ; 6.7 (240) Heating ; 6.7 (240)	—
	Outdoor Air	m³/min (cfm)	—	22.4 (790)
Noise Level		dB (A)	Cooling ; High 36/35, Low 30/29 Heating ; High 36/35, Low 30/29	Cooling ; High 47/45 Heating ; High 49/47
Electrical Data	Input	W	Cooling ; 640 - 590 Heating ; 640 - 600	
	Running Current	A	Cooling ; 3.1 - 3.0 Heating ; 3.1 - 3.0	
	COP	W/W	Cooling ; 3.2 - 3.4 Heating ; 3.4 - 3.5	
	Starting Current	A	13	
Piping Connection Port (Flare piping)		inch	G ; Half Union 3/8"	G ; 3-way valve 3/8"
		inch	L ; Half Union 1/4"	L ; 2-way valve 1/4"
Pipe Size (Flare piping)		inch	G (gas side) ; 3/8"	G (gas side) ; 3/8"
		inch	L (liquid side) ; 1/4"	L (liquid side) ; 1/4"
Drain Hose	Inner diameter	mm	12	—
	Length	m	0.7	—
Power Cord Length		m	2.1	—
Number of core-wire			3 (1.0mm²)	—
Dimensions	Height	inch (mm)	11-7/16 (290)	18-29/32 (480)
	Width	inch (mm)	31-15/32 (799)	30-23/32 (780)
	Depth	inch (mm)	6-29/32 (175)	9-21/32 (245)
Net Weight		lb (kg)	18 (8.0)	64 (29.0)
Compressor	Type		—	Rotary (1 cylinder) rolling piston type
	Motor Type		—	Induction (2-pole)
	Rated Output	W	—	550
Air Circulation	Type		Cross-flow Fan	Propeller Fan
	Material		AS + Glass Fiber 30%	AES + Glass Fiber 12%
	Motor Type		Transistor (4-pole)	Induction (6-pole)
	Input	W	—	58.6
	Rated Output	W	20	20
	Fan Speed	Low	rpm	950
		Medium	rpm	1,030
		High	rpm	1,150
				730

Product Specifications

		Unit	CS-A70KE	CU-A70KE
Heat Exchanger	Description		Evaporator	Condenser
	Tube material		Copper	Copper
	Fin material		Aluminium	Aluminium
	Fin Type		Slot Fin	Corrugated Fin
	Row / Stage		(Plate fin configuration, forced draft) 2 × 12	

- Specifications are subject to change without notice for further improvement.

Product Specifications

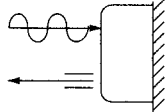
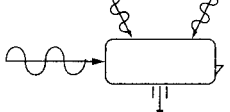
		Unit	CS-A90KE	CU-A90KE
Cooling Capacity		kW	2.65 - 2.60	
		Btu/h	9,000 - 8,900	
Heating Capacity		kW	3.15 - 3.00	
		Btu/h	10,700 - 10,200	
Moisture Removal		ℓ/h	1.6	
		Pint/h	3.4	
Power Source		Phase	Single	
		V	240 - 220	
		Cycle	50	
Airflow Method		OUTLET  INTAKE 	SIDE VIEW 	TOP VIEW 
Air Volume	Indoor Air (Lo)	m³/min (cfm)	Cooling ; 6.3 (220) Heating ; 6.4 (230)	—
	Indoor Air (Me)	m³/min (cfm)	Cooling ; 7.4 (260) Heating ; 7.5 (260)	—
	Indoor Air (Hi)	m³/min (cfm)	Cooling ; 8.4 (300) Heating ; 8.6 (300)	—
	Outdoor Air	m³/min (cfm)	—	22.4 (790)
Noise Level		dB (A)	Cooling ; High 38/38, Low 30/30 Heating ; High 39/39, Low 30/30	Cooling ; High 49/48 Heating ; High 49/47
Electrical Data	Input	W	Cooling ; 930 - 880 Heating ; 950 - 880	
	Running Current	A	Cooling ; 4.1 - 4.1 Heating ; 4.2 - 4.1	
	COP	W/W	Cooling ; 2.8 - 3.0 Heating ; 3.3 - 3.4	
	Starting Current	A	20	
Piping Connection Port (Flare piping)		inch	G ; Half Union 3/8"	G ; 3-way valve 3/8"
		inch	L ; Half Union 1/4"	L ; 2-way valve 1/4"
Pipe Size (Flare piping)		inch	G (gas side) ; 3/8"	G (gas side) ; 3/8"
		inch	L (liquid side) ; 1/4"	L (liquid side) ; 1/4"
Drain Hose	Inner diameter	mm	12	—
	Length	m	0.7	—
Power Cord Length		m	2.1	—
Number of core-wire			3 (1.0mm²)	—
Dimensions	Height	inch (mm)	11-7/16 (290)	18-29/32 (480)
	Width	inch (mm)	31-15/32 (799)	30-23/32 (780)
	Depth	inch (mm)	6-29/32 (175)	9-21/32 (245)
Net Weight		lb (kg)	18 (8.0)	71 (32.0)
Compressor	Type		—	Rotary (1 cylinder) rolling piston type
	Motor Type		—	Induction (2-pole)
	Rated Output	W	—	750
Air Circulation	Type		Cross-flow Fan	Propeller Fan
	Material		AS + Glass Fiber 30%	AES + Glass Fiber 12%
	Motor Type		Transistor (4-pole)	Induction (6-pole)
	Input	W	—	58.6
	Rated Output	W	20	20
	Fan Speed	Low	rpm	980
		Medium	rpm	1,150
		High	rpm	1,310

Product Specifications

		Unit	CS-A90KE	CU-A90KE
Heat Exchanger	Description		Evaporator	Condenser
	Tube material		Copper	Copper
	Fin material		Aluminium	Aluminium
	Fin Type		Slot Fin	Corrugated Fin
	Row / Stage		(Plate fin configuration, forced draft)	
	FPI		2 × 12	1 × 18
	Size (W × H × L)	mm	18	19
Refrigerant Control Device			600 × 252 × 25.4	856 × 457.2 × 22
Refrigerant Control Device			–	Capillary Tube
Refrigeration Oil		(c.c)	–	SUNISO 4GDID or ATMOS M60 (350)
Refrigeration (R-22)		g (oz)	–	850 (30.0)
Thermostat			Electronic Control	–
Protection Device			–	Overload Protector
Capillary Tube	Length	mm	–	Cooling ; 1,033 Heating ; 585
	Flow Rate	ℓ/min	–	Cooling ; 4.8, Heating ; 9.9
	Inner Diameter	mm	–	Cooling ; 1.2, Heating ; 1.4
Air Filter	Material		P.P.	–
	Style		Honeycomb	–
Capacity Control			Capillary Tube	
Compressor Capacitor		μF, VAC	–	25 μF, 370VAC
Fan Motor Capacitor		μF, VAC	–	1.2 μF, 400VAC

- Specifications are subject to change without notice for further improvement.

Product Specifications

		Unit	CS-A120KE	CU-A120KE
Cooling Capacity		kW Btu/h	3.50 - 3.45 11,900 - 11,800	
Heating Capacity		kW Btu/h	4.10 - 4.00 14,000 - 13,600	
Moisture Removal		ℓ/h Pint/h	2.0 4.2	
Power Source		Phase V Cycle	Single 240 - 220 50	
Airflow Method		OUTLET  INTAKE	SIDE VIEW 	TOP VIEW 
Air Volume	Indoor Air (Lo)	m³/min (cfm)	Cooling ; 7.5 (260) Heating ; 7.8 (280)	—
	Indoor Air (Me)	m³/min (cfm)	Cooling ; 8.4 (300) Heating ; 8.7 (310)	—
	Indoor Air (Hi)	m³/min (cfm)	Cooling ; 9.3 (330) Heating ; 9.7 (340)	—
	Outdoor Air	m³/min (cfm)	—	22.0 (780)
Noise Level		dB (A)	Cooling ; High 42/41, Low 38/37 Heating ; High 43/42, Low 38/37	Cooling ; High 49/48 Heating ; High 49/48
Electrical Data	Input	W	Cooling ; 1.25 - 1.22 Heating ; 1.28 - 1.23	
	Running Current	A	Cooling ; 5.6 - 5.7 Heating ; 5.7 - 5.7	
	COP	W/W	Cooling ; 2.8 - 2.8 Heating ; 3.2 - 3.3	
	Starting Current	A	25	
Piping Connection Port (Flare piping)		inch inch	G ; Half Union 1/2" L ; Half Union 1/4"	G ; 3-way valve 1/2" L ; 2-way valve 1/4"
Pipe Size (Flare piping)		inch inch	G (gas side) ; 1/2" L (liquid side) ; 1/4"	G (gas side) ; 1/2" L (liquid side) ; 1/4"
Drain Hose	Inner diameter	mm	12	—
	Length	m	0.7	—
Power Cord Length		m	2.1	—
Number of core-wire		m	3 (1.0mm²)	—
Dimensions	Height	inch (mm)	11-7/16 (290)	18-29/32 (480)
	Width	inch (mm)	31-15/32 (799)	30-23/32 (780)
	Depth	inch (mm)	6-29/32 (175)	9-21/32 (245)
Net Weight		lb (kg)	18 (8.0)	84 (38.0)
Compressor	Type		—	Rotary (1 cylinder) rolling piston type
	Motor Type		—	Induction (2-pole)
	Rated Output	W	—	1,100
Air Circulation	Type		Cross-flow Fan	Propeller Fan
	Material		AS + Glass Fiber 30%	AES + Glass Fiber 12%
	Motor Type		Transistor (4-pole)	Induction (6-pole)
	Input	W	—	58.6
	Rated Output	W	20	20
	Fan Speed	Low	rpm	1,210
		Medium	rpm	1,350
		High	rpm	1,500

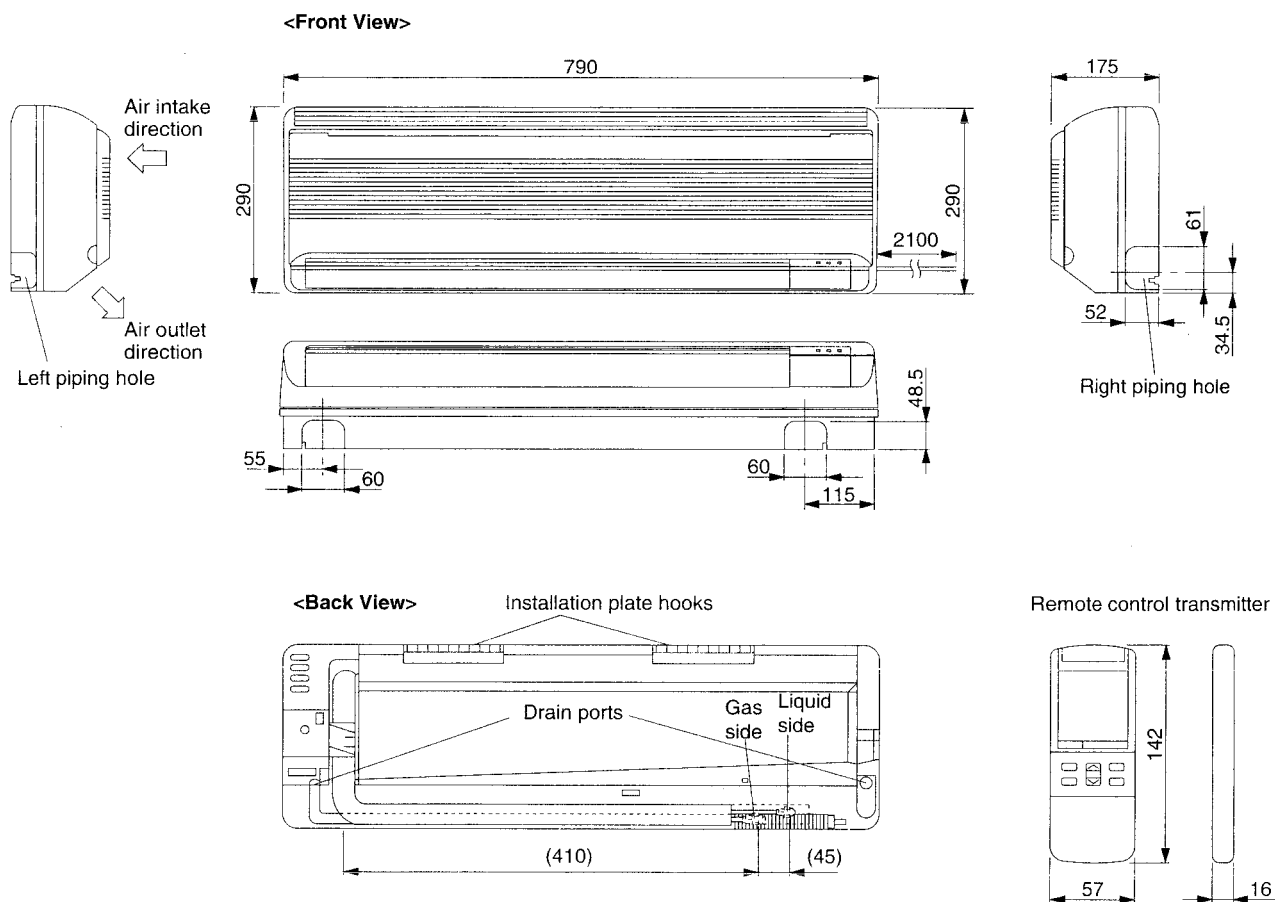
Product Specifications

		Unit	CS-A120KE	CU-A120KE
Heat Exchanger	Description		Evaporator	Condenser
	Tube material		Copper	Copper
	Fin material		Aluminium	Aluminium
	Fin Type		Slot Fin	Corrugated Fin
	Row / Stage		(Plate fin configuration, forced draft) 2 × 12	2 × 19
	FPI		21	16
	Size (W × H × L)	mm	600 × 252 × 25.4	706.2 × 482.6 × 44
Refrigerant Control Device			–	Capillary Tube
Refrigeration Oil		(c.c)	–	SUNISO 4GDID or ATMOS M60 (430)
Refrigeration (R-22)		g (oz)	–	1,100 (38.8)
Thermostat			Electronic Control	–
Protection Device			–	Overload Protector
Capillary Tube	Length	mm	–	Cooling ; 720 Heating ; 550
	Flow Rate	ℓ/min	–	Cooling ; 7.5, Heating ; 12.5
	Inner Diameter	mm	–	Cooling ; 1.3, Heating ; 1.5
Air Filter	Material		P.P.	–
	Style		Honeycomb	–
Capacity Control			Capillary Tube	
Compressor Capacitor		μF, VAC	–	30 μF, 370VAC
Fan Motor Capacitor		μF, VAC	–	1.2 μF, 400VAC

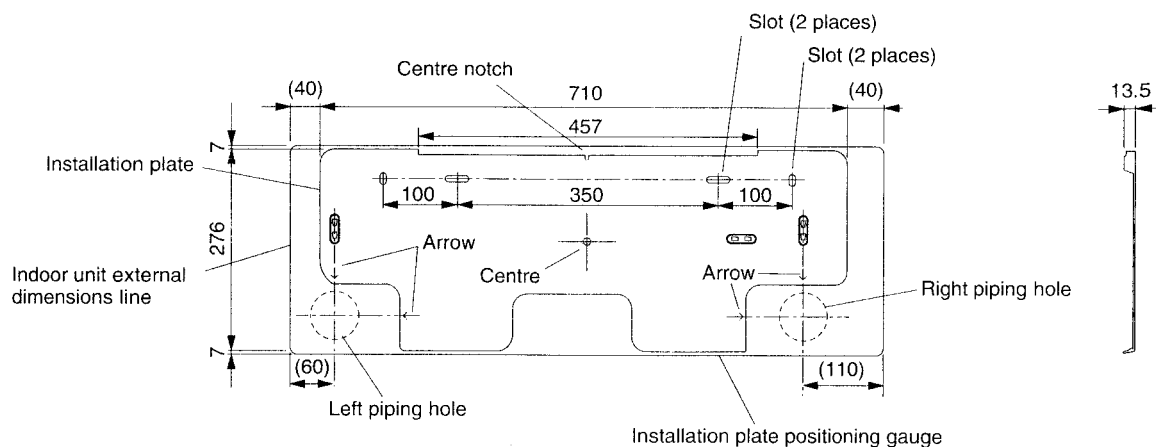
- Specifications are subject to change without notice for further improvement.

Dimensions

CS-A70KE / CS-A90KE / CS-A120KE

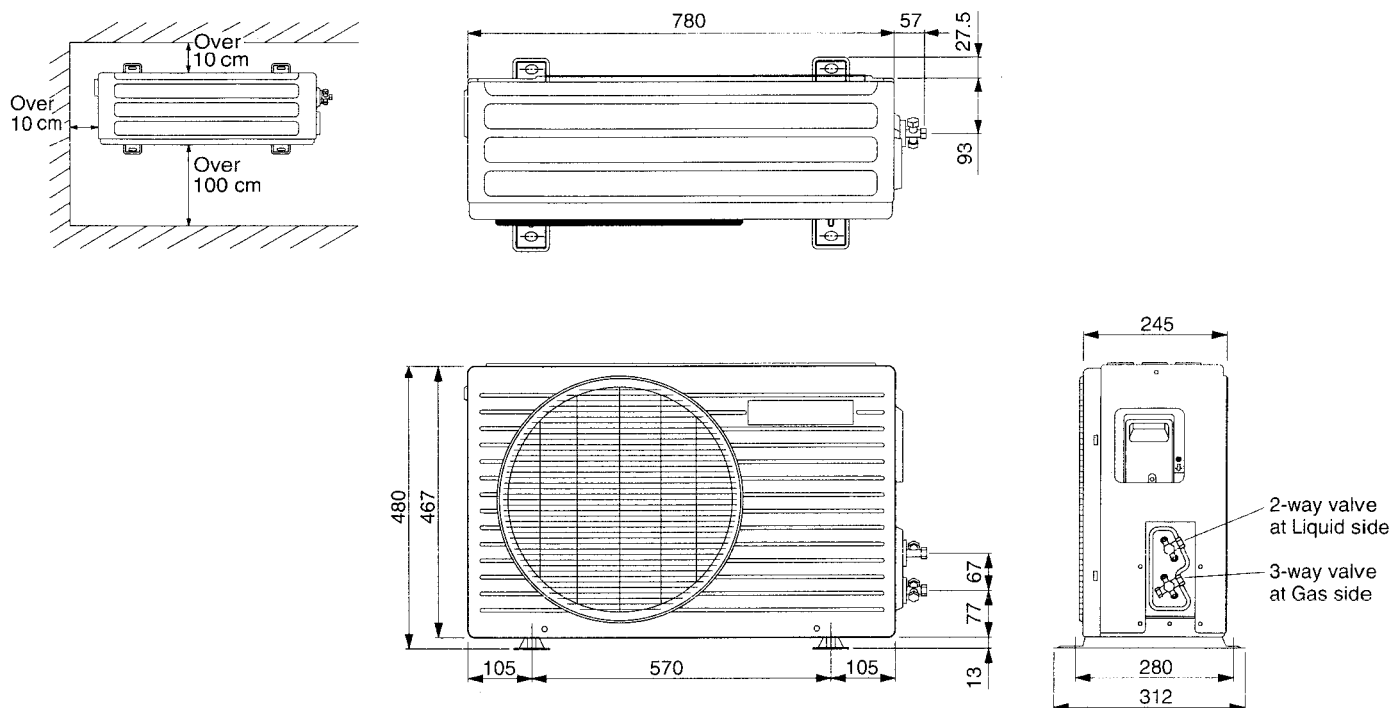


Relative position between the indoor unit and the installation plate <Front View>

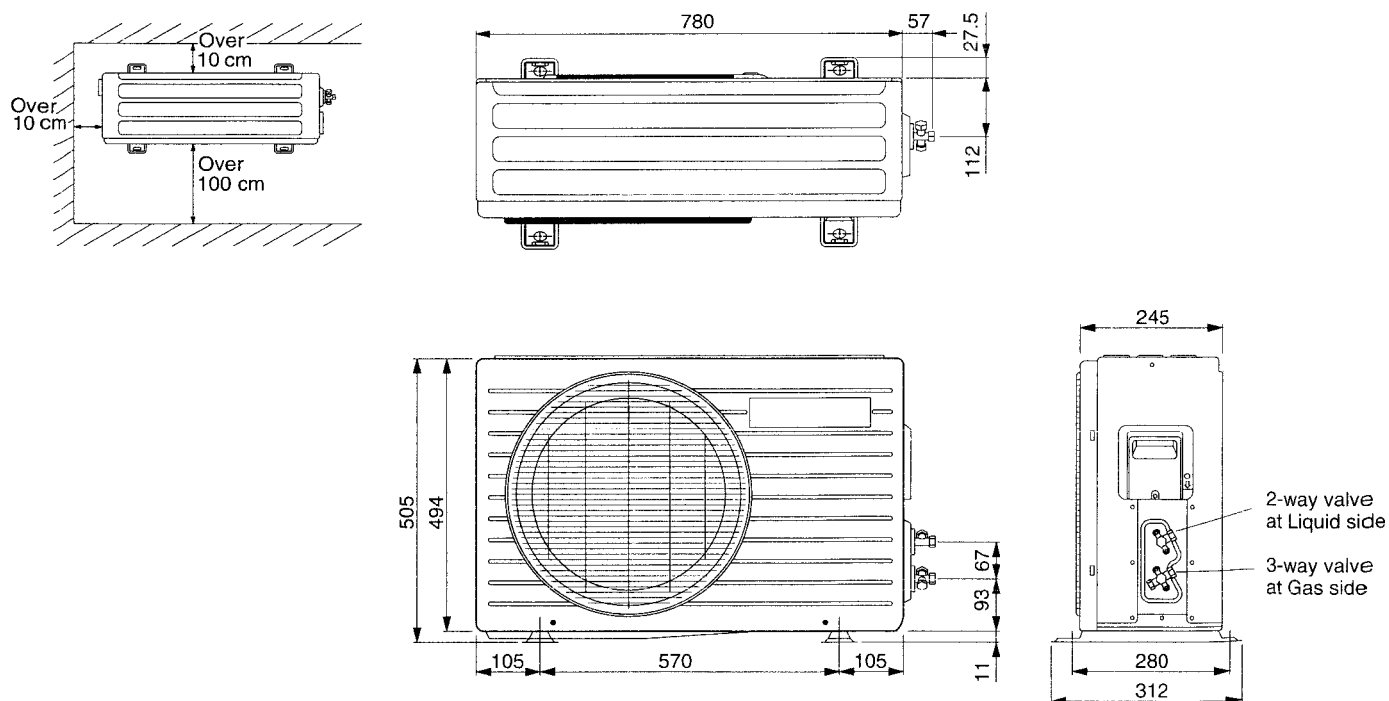


Dimensions

CU-A70KE / CU-A90KE

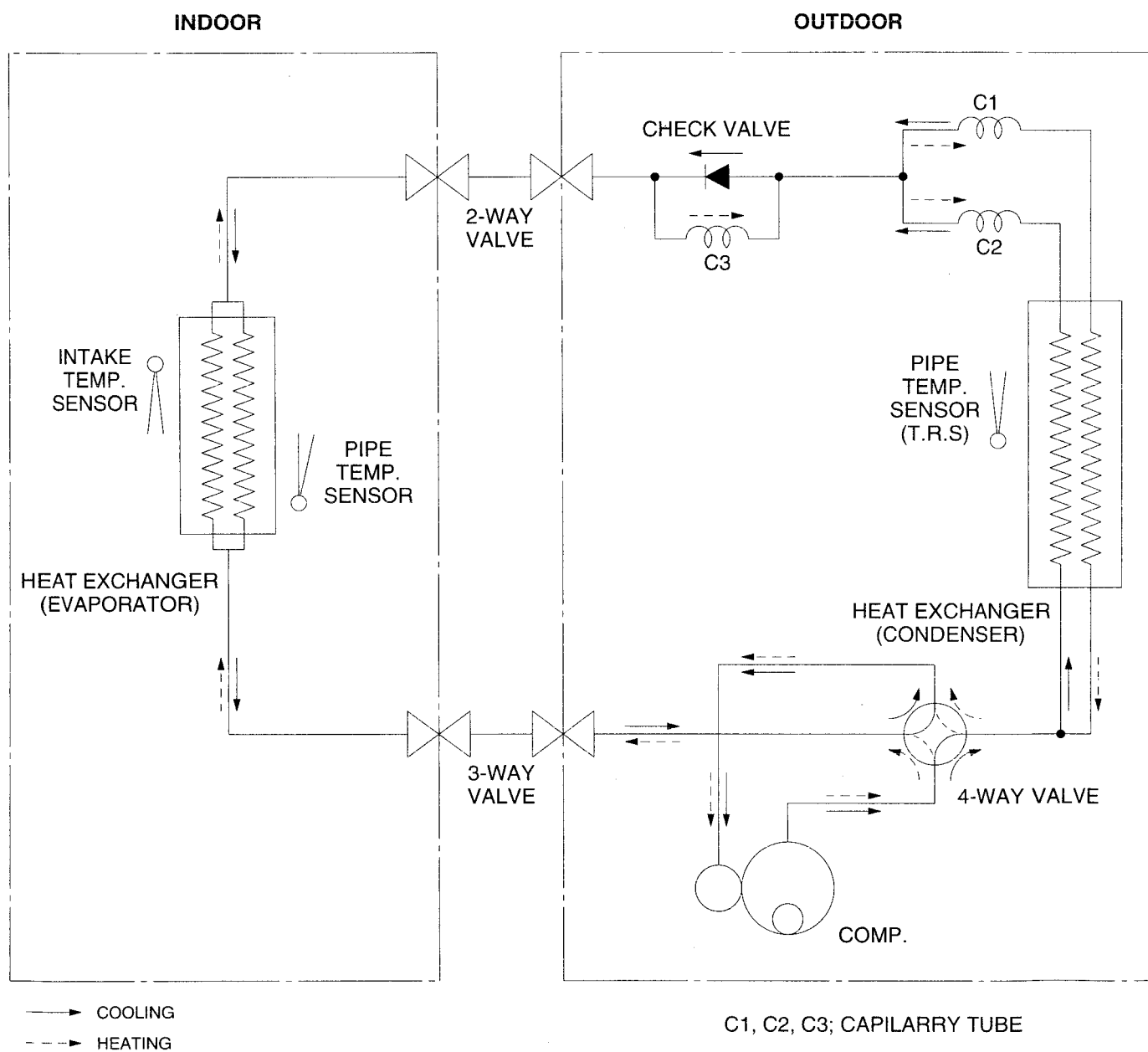


CU-A120KE



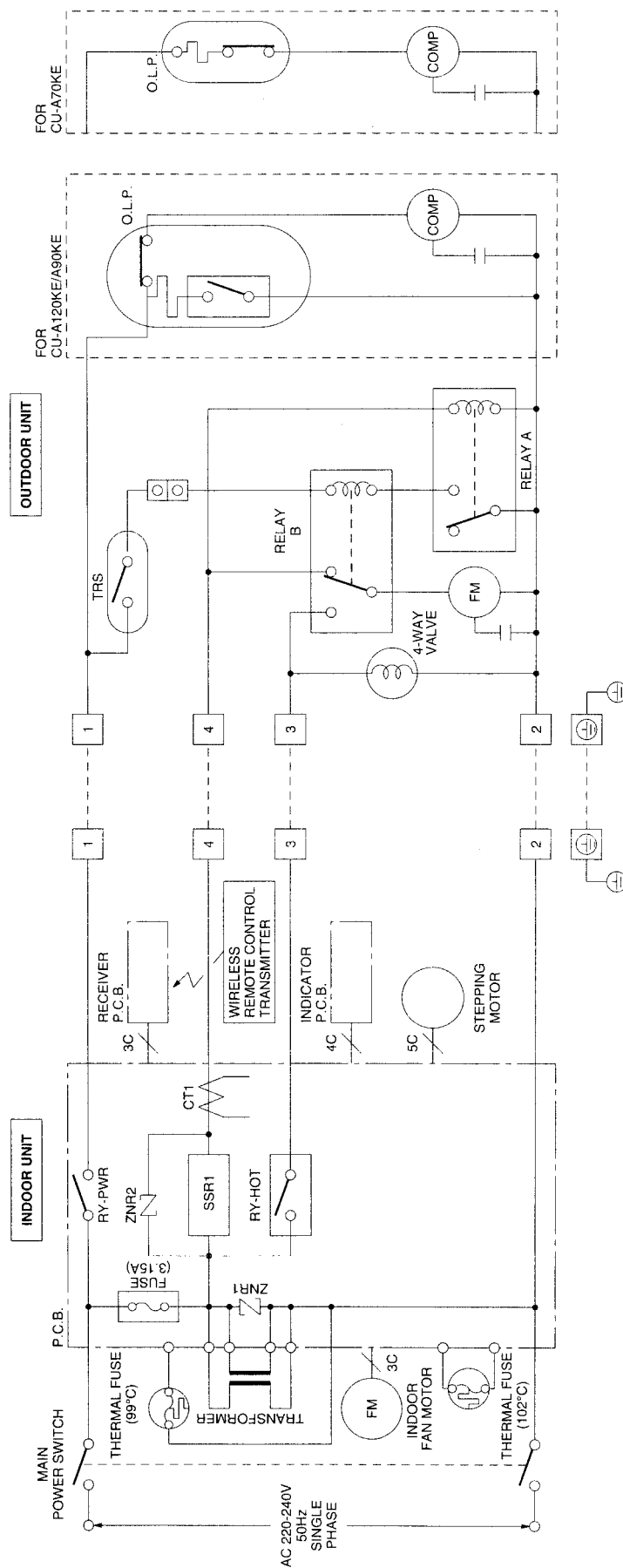
Refrigeration Cycle Diagram

CS-A70KE / CU-A70KE
CS-A90KE / CU-A90KE
CS-A120KE / CU-A120KE



Block Diagram

CS-A70KE / CU-A70KE
CS-A90KE / CU-A90KE
CS-A120KE / CU-A120KE

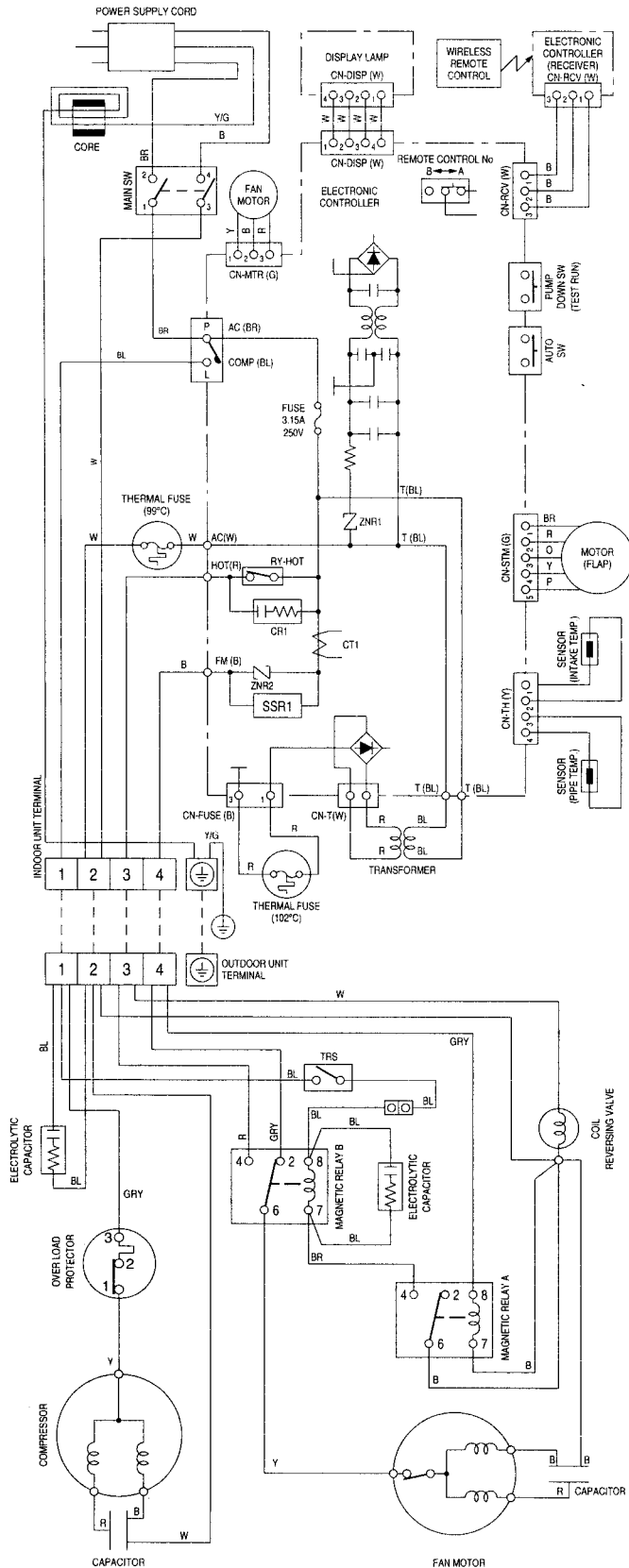


✕ [] Indicates the electronic control unit.

✕ "C" Indicates the number of core wires. (Example: 5C=5 Core wires).

Wiring Diagram

CS-A70KE / CU-A70KE



REMARKS:

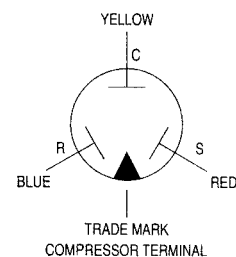
B : BLUE
 BR : BROWN
 BL : BLACK
 W : WHITE
 R : RED
 O : ORANGE
 P : PINK
 Y/G : YELLOW/
 GREEN
 GRY : GRAY

Resistance of Outdoor Fan Motor Windings

CONNECTION	CWA95245 (Ω)
BLUE - YELLOW	312.9
YELLOW - RED	419.7

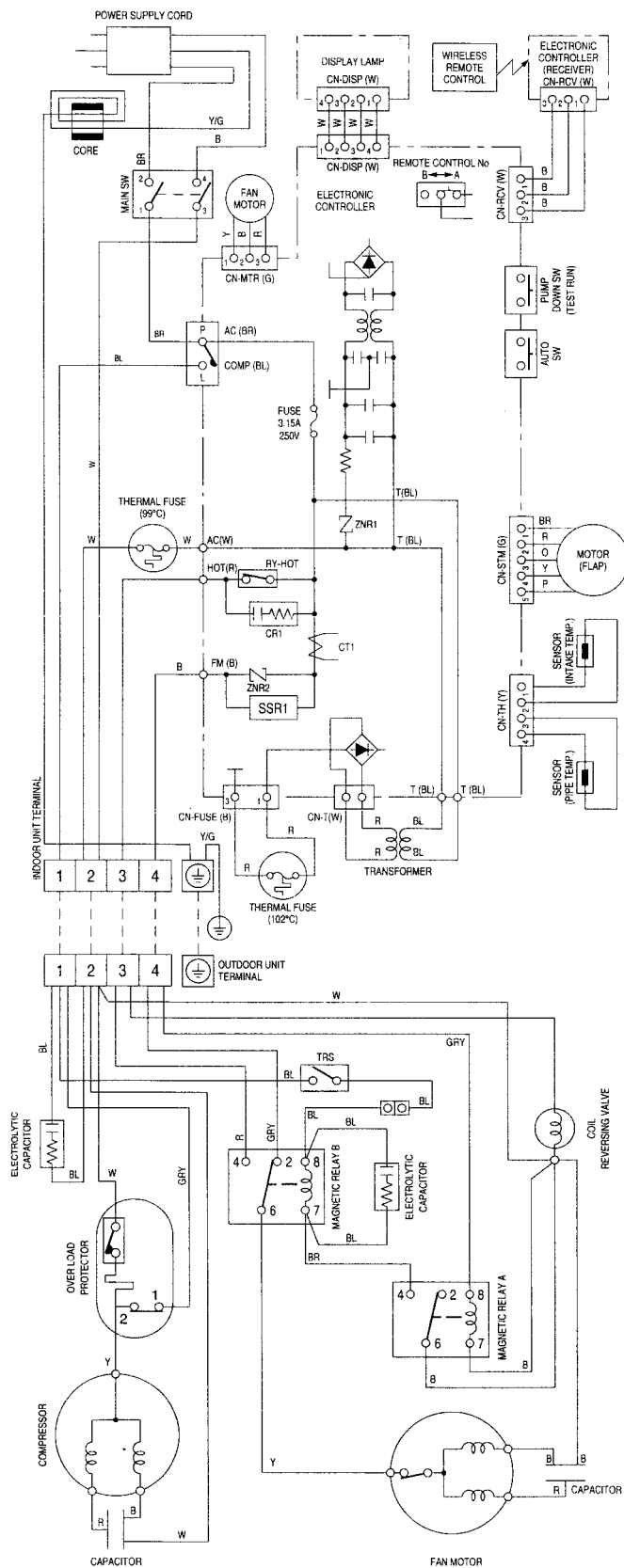
Resistance of Compressor Windings

CONNECTION	2RS122D5AB02 (Ω)
C-R	5.63
C-S	12.17



Wiring Diagram

CS-A90KE / CU-A90KE CS-A120KE / CU-A120KE



REMARKS:

B : BLUE
 BR : BROWN
 BL : BLACK
 W : WHITE
 R : RED
 O : ORANGE
 P : PINK
 Y/G : YELLOW/
 GREEN
 GRY : GRAY

Resistance of Outdoor Fan Motor Windings

CONNECTION	CWA95245 (Ω)
BLUE - YELLOW	312.9
YELLOW - RED	419.7

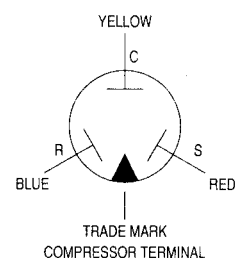
Resistance of Compressor Windings

CS-A90KE / CU-A90KE

CONNECTION	2PS164D3AD02 (Ω)
C-R	3.43
C-S	4.76

CS-A120KE / CU-A120KE

CONNECTION	2KS224D5AC02 (Ω)
C-R	2.45
C-S	3.86



Operation Details

1) Cooling Mode Operation

Cooling in operation according to Remote Control setting.

Time Delay Safety Control (3 minutes)

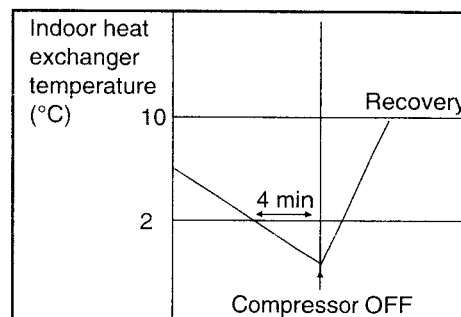
- When the compressor is stopped by Power Switch, Remote Control or there is a power failure, it restarts after 3 minutes when the Power Switch, Remote Control is turned ON or the power supply is resumed.
- When the setting temperature is reached during cooling operation, the compressor stops and it will not start for 3 minutes.

7 minutes Time Saved Control

- The compressor will start automatically if it has stopped for 7 minutes even if the room temperature is below the compressor ON temperature.

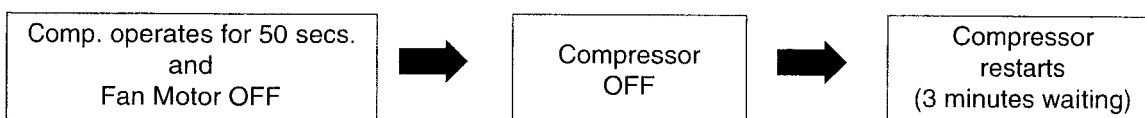
Anti-Freezing Control

- If the temperature of the indoor heat exchanger falls continuously below 2°C for 4 minutes, the compressor turns off to protect the indoor heat exchanger from freezing. The fan speed setting remains the same.
- Compressor recommences when the indoor heat exchanger temperature rises to 10°C (Recovery).
 ※ 3 minutes waiting of Time Delay Safety Control is valid for Cooling Operation.



Compressor Protection Control

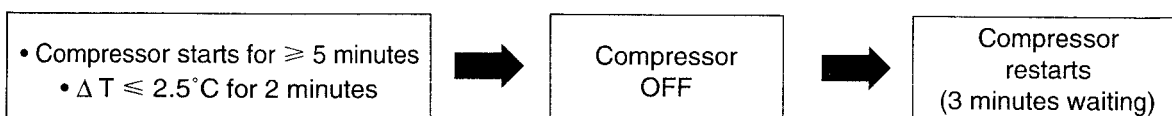
- After the compressor starts for 50 seconds but the outdoor fan motor is still OFF, the compressor will stop and restart automatically. (Time Delay Safety Control is valid).



- If the above phenomenon is repeated for 3 times, the compressor will stop.
- The above phenomenon is reset when there is a change to heating mode or stopped by Remote Control Switch.

Compressor Reverse Rotation Protection Control

- If the compressor is operating continually for 5 minutes or longer and the temperature difference between intake air and indoor heat exchanger is 2.5°C or less for 2 minutes, compressor will stop and restart automatically. (Time Delay Safety Control is valid).



ΔT = intake air temperature – indoor heat exchanger temperature

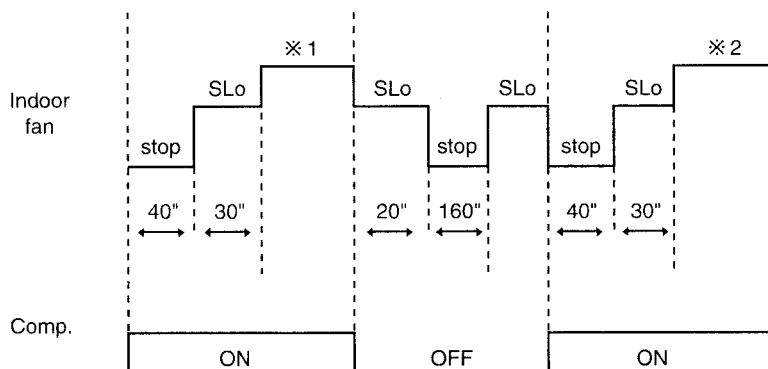
This is to protect reverse rotation of the compressor when there is a instantaneous power failure.

Operation Details

Automatic Fan Speed Mode

When Automatic Fan Speed is selected at Remote Control during cooling operation.

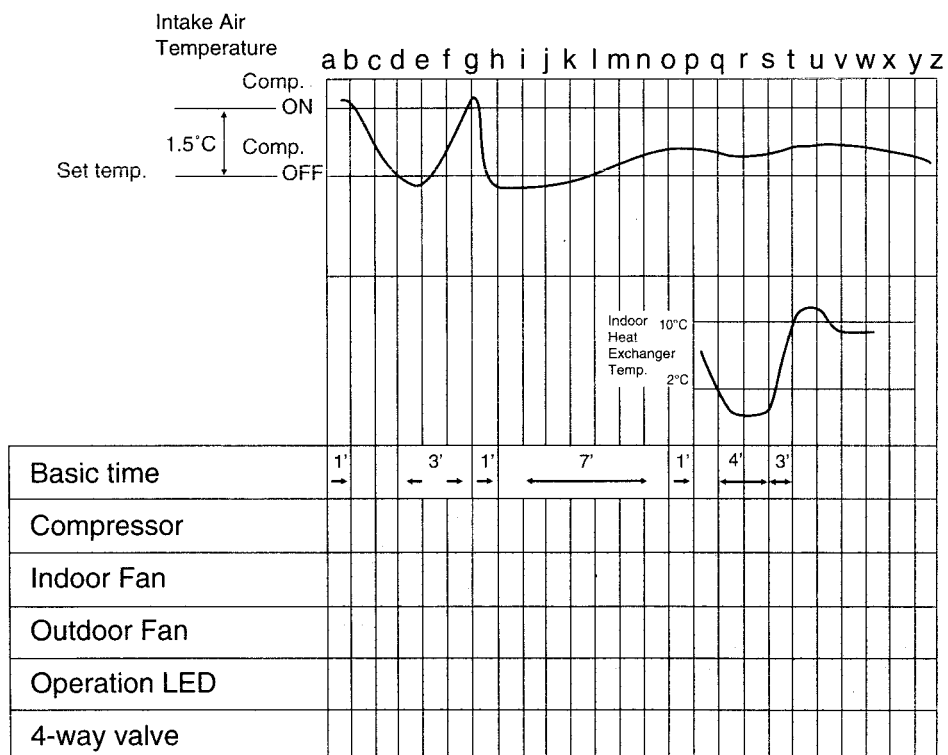
- Fan speed rotates in the range of Hi to Me.
- Deodorizing Control.



※ 1 Fan Speed is Hi until the compressor stops (when the set temperature is reached).

※ 2 Fan Speed is Me after the compressor restarts.

Cooling Operation Time Diagram



<Description of operation>

- d - g : Time Delay Safety Control (waiting for 3 minutes)
 g - h : 60 sec. Forced Operation
 h - o : 7 min. Time Saved Control
 q - t : Anti Freezing Control

Operation

Stop

Operation Details

2) Soft Dry Mode Operation

- The unit starts cooling operation until the room temperature reaches the setting temperature set on the Remote Control, and then Soft Dry operation will start.
(During Soft Dry operation, the indoor fan operates with SLo speed.)
- Once room temperature reaches below Soft Dry OFF temperature, Indoor Fan, Compressor and Outdoor Fan stop for 6 minutes.

Time Delay Safety Control

- Once the compressor stops, it will not start for 3 minutes during Cooling operation.

Anti-Freezing Control

- Same as Anti-Freezing Control for Cooling Mode operation. (For Soft Dry region, 6 minutes waiting is valid during compressor stops.)

Compressor Protection Control

- Same as Compressor Protection Control for Cooling Mode Operation. (Refer page 17)

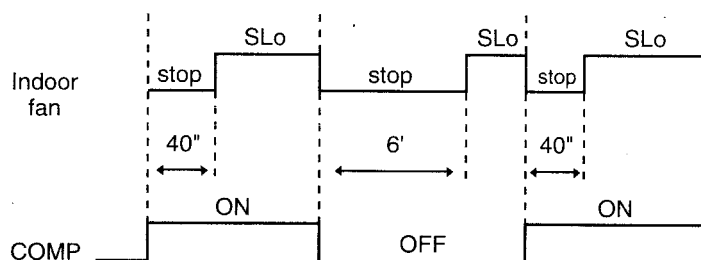
Compressor Reverse Rotation Protection

- Same as Compressor Reverse Rotation Protection Control for Cooling Mode Operation. (Refer page 17)

Automatic Fan Speed Mode

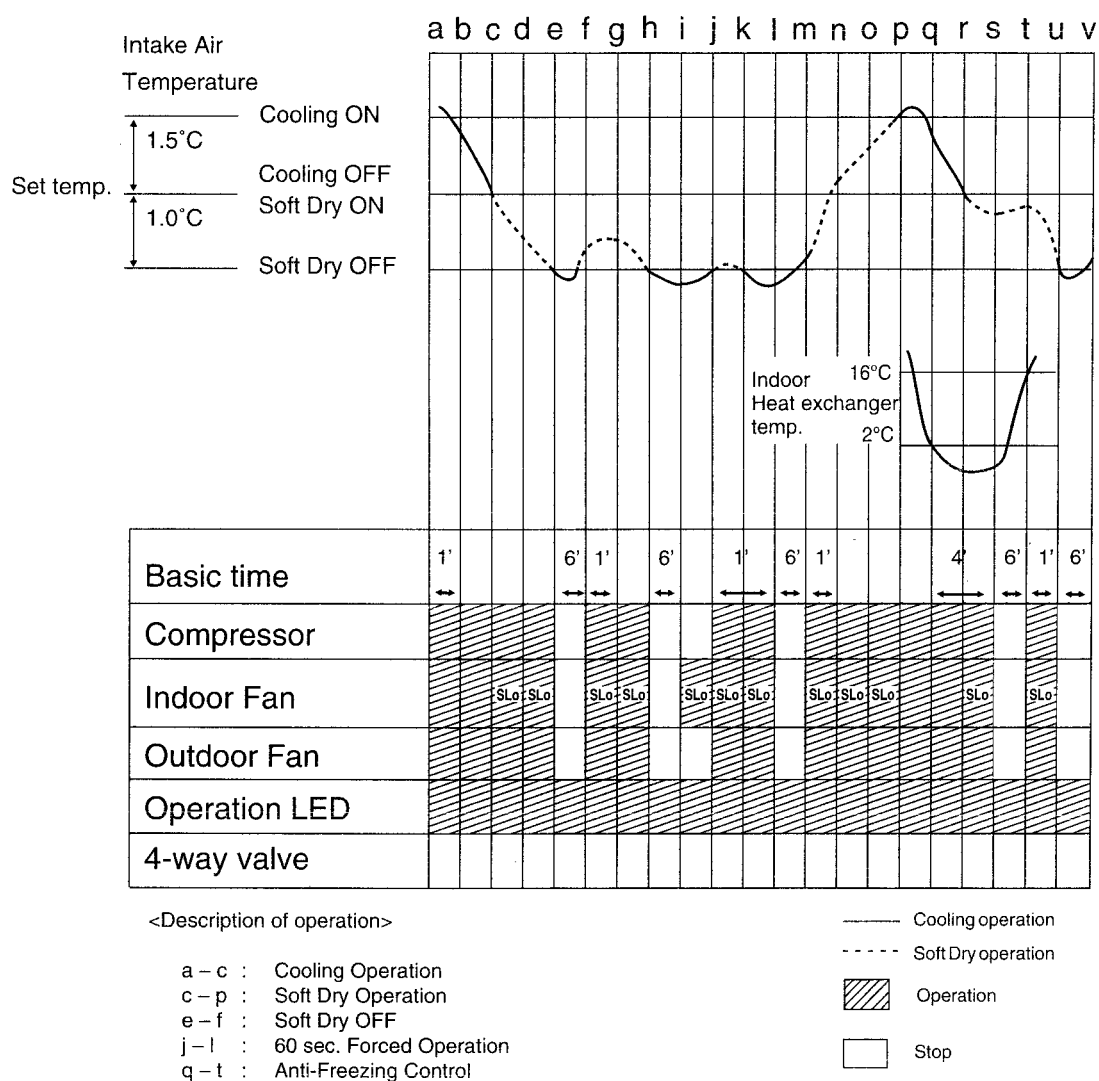
When Automatic Fan Speed is selected at Remote Control during Soft Dry Operation.

- Fan speed rotates at SLo.
- Deodorizing Control.



Operation Details

Soft Dry Operation Time Diagram



Operation Details

3) Heating Mode Operation

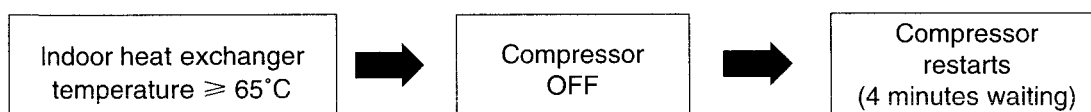
Heating in operation according to Remote Control setting.

Time Delay Safety Control

- When the compressor is stopped by Power Switch, Remote Control or there is a power failure, it restarts after 3 minutes when the Power Switch, Remote Control is turned ON or the power supply is resumed.
- When the setting temperature is reached during heating operation, the compressor stops and it will not start for 4 minutes.
- Indoor Fan stops for 1 minute after 3 minutes compressor stops. Then, it will operate with SLo fan speed.

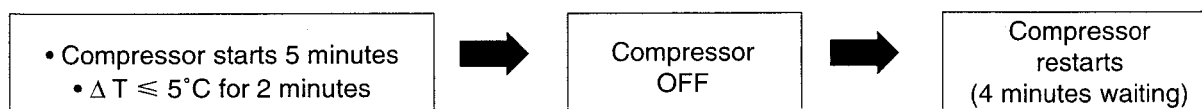
Overload Protection Control

- If the temperature of the indoor heat exchanger rises to 51°C, Outdoor Fan stops. The Outdoor Fan restarts when the indoor heat exchanger temperature falls to 49°C.
- If the indoor heat exchanger becomes 65°C or more, the compressor will stop and restart automatically. (Time Delay Safety Control – 4 minutes waiting)



Compressor Reverse Rotation Protection Control

- If the compressor is operating continually for 5 minutes or longer and temperature difference between intake air and indoor heat exchanger is 5°C or less for 2 minutes, compressor will stop and restart automatically. (Time Delay Safety Control is valid).



ΔT = Indoor heat exchanger temperature – intake air temperature

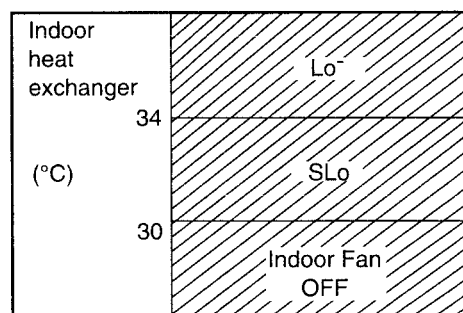
This is to protect reverse rotation of the compressor when there is a instantaneous power failure.

4-way Valve Control

- 4-way valve always ON during Heating operation.
- When the unit is switched to "OFF" during Heating operation, 4-way valve stays at Heating position for 5 minutes.

Hot Start Control

When Heating operation starts, Indoor Fan will not start until the indoor heat exchanger reaches 30°C as diagram shown.



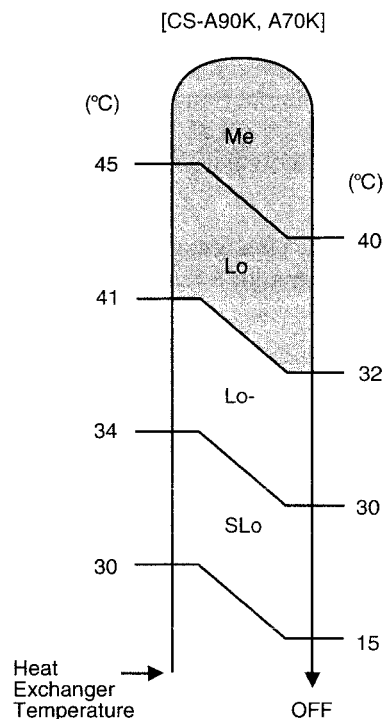
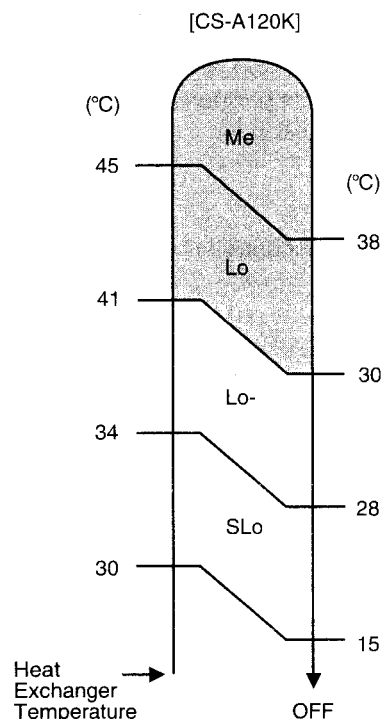
Hot Start is completed when indoor heat exchanger reaches 41°C.

Operating Details

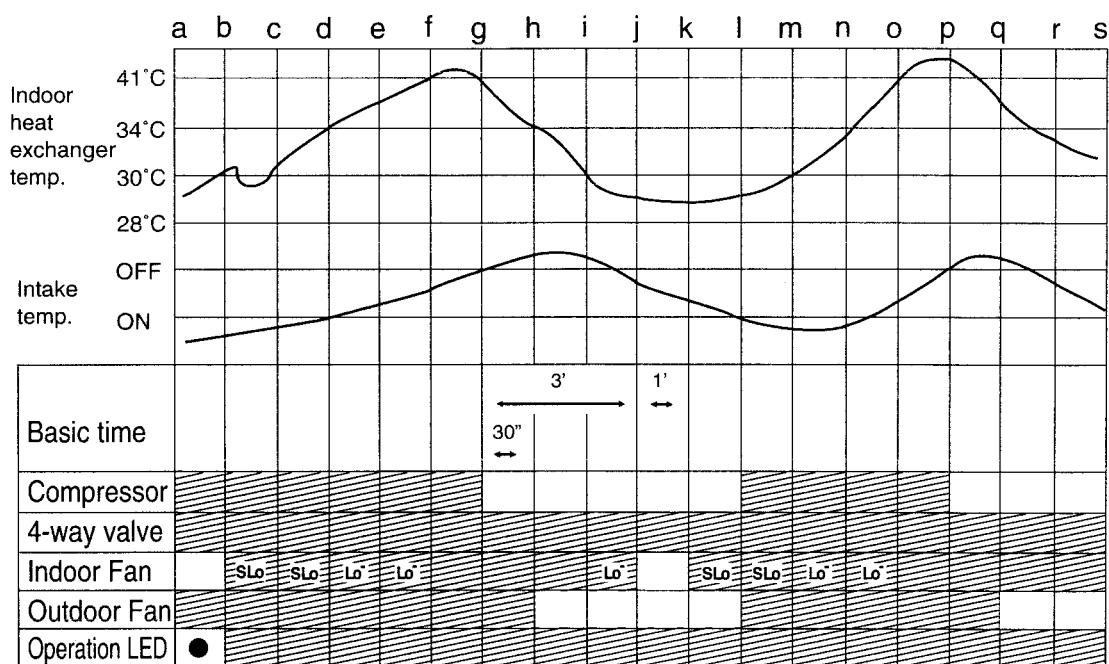
Automatic Fan Speed Mode

When Automatic Fan Speed is selected at Remote Control during heating operation.

- Fan speed rotates in the range of Me → SLo according to the heat exchanger temperature.



Heating Operation Time Diagram



(For CS-A120K only)

<Description of operation>

- a – b : Hot start (Indoor fan = OFF)
- b – d : Hot start (Indoor fan = SLo)
- g – l : Indoor fan control (controlled during thermostat OFF)
- g – h : Outdoor fan control (30 sec. Forced Operation) after compressor stops.

- : Blinking
- ▨ : Operation
- : Stop

Operating Details

Deicing Control

Deice starts to prevent frosting at outdoor heat exchanger.

- Normal Deicing

Deice operation detection commences after 30 minutes of Heating operation starts or 60 minutes after previous deice operation. If the TRS (Thermal Reed Switch) senses the outdoor piping temperature drops to -3°C (TRS CLOSE) or less for 50 sec. continuously during compressor is in operation, deice will start.
(There is no detection during Outdoor Fan stops.)

- Overload Deicing

During heating operation, if the outdoor Fan OFF duration (due to overload control) is accumulated up to 60 minutes and after compressor starts for 1 minutes, deicing starts.

- Deicing ends when

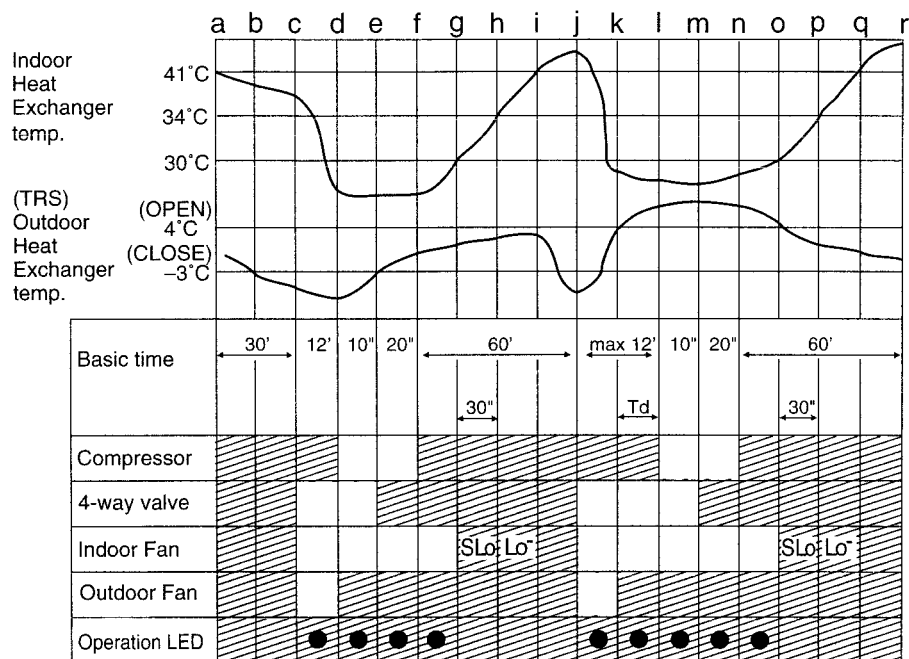
- 12 minutes after deicing operation starts;
- TRS senses the outdoor piping temperature rises to 4°C (TRS OPEN).
- Deicing will not end immediately as time delay (T_d) is valid as shown below.

Time taken from deicing starts to TRS OPEN (T)	T_d (seconds)
$T < 3$ minutes	0
$3 \text{ minutes} \leq T < 6$ minutes	60
$6 \text{ minutes} \leq T < 9$ minutes	120
$T \geq 9$ minutes	180

- Once deicing operation starts, it will not end for 60 seconds.
- After deicing operation, compressor stops for 30 seconds and 4-way valve stays at cooling position for 10 seconds.

Operating Details

Normal Deicing Time Diagram

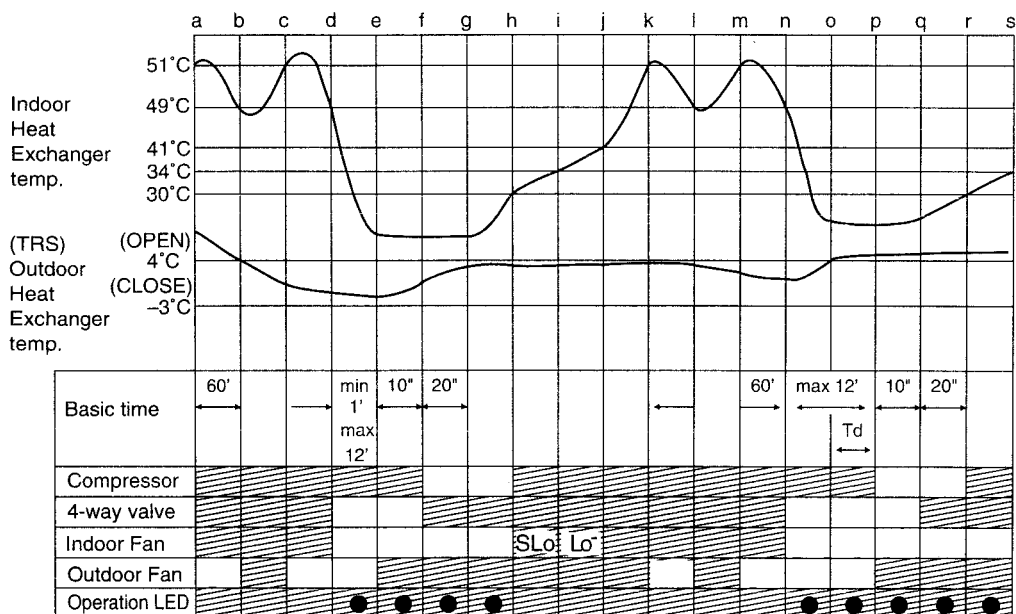


<Description of operation>

- a - c : Deicing operation judging condition established.
- c - d : Deicing operation (timer detected)
- d - e, l - m : Time delay for 4-way valve
- e - f, m - n : Time delay for Compressor
- f - g, n - o : Hot start (no thermo OFF)
- g - h, o - p : No thermo OFF (after finished hot start)
- j - l : Deicing operation (TRS detected)

- : Blinking
- Operation
- Stop

Overload Deicing Time Diagram



<Description of operation>

- a - d, k - h : Overload Control
- d - g : Overload Deicing (timer detected)
- g - h : Hot Start (indoor fan OFF)
- h - i : Hot Start (indoor fan SLo)
- n - p : Overload Control (TRS detected)

- : Blinking
- Operation
- Stop

Operation Details

4) Automatic Mode Operation

Standard for Determining Operation Mode

↑ Intake air temperature	23°C	Cooling Mode		
	20°C	Soft Dry Mode		
		Heating Mode		
			Setting Temperature (Standard)	
			Cooling Mode	25°C
			Soft Dry Mode	22°C
			Heating mode	21°C

- Indoor fan operates at SLo fan speed for 20 seconds.
- After judging indoor air temperature, the operation mode is determined and operation continued at the mode determined.
- If indoor intake air is less than 16°C, Heating mode will immediate operate.
- After the operation mode has been determined, the mode does not change. However, Soft Dry mode operation includes Cooling mode operation.
- If Automatic Mode operation is started while the air conditioner is operating, operation will continue. If current operation is in Cooling mode (including the operation which is a part of Soft Dry mode operation), it will be maintained, for 20 seconds at SLo fan speed. Then, the selected operation mode will continue.
- Room temperature adjustment.
The following are added to the setting temperature specified as above.

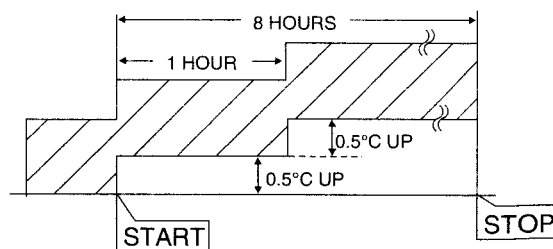
Higher	→	+2°C
Standard	→	±0°C
Lower	→	-2°C

5) Sleep Mode Auto Operation

Cooling or Soft Dry operation

When you press the SLEEP Mode, the following movement will start to avoid overcooling.

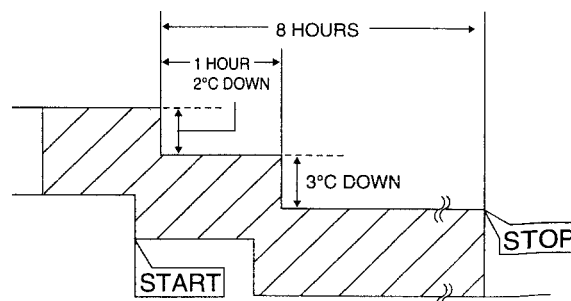
- The fan speed is automatically set to Low.
- The setting temperature will be risen by 0.5°C at the start of operation and by 0.5°C one hour later.
- The operation will stop after 8 hours.



Heating operation

When you press the SLEEP Mode, the following movement will start to avoid overheating.

- The fan speed is automatically set to Low or Super Low.
- The setting temperature will be dropped by 2°C at the start of operation and by 3°C one hour later.
- The operation will stop after 8 hours.



Operation Details

6) Auto Restart Control

- If there is a power failure, operation will be automatically restarted when the power is resumed. It will start with previous operation mode and airflow direction. (Time Delay Safety Control is valid)
- Auto Restart Control is not available when Timer or Sleep Mode is set.
- This control can be omitted by cutting the jumper wire J2. (Refer Circuit Diagram)

7) Indoor Fan Motor Control

- Auto Fan Speed Control
When set to Auto Fan Speed, the fan speed is adjusted between maximum and minimum setting as shown in the table.
- Manual Fan Speed Control
Basic fan speed adjustment (3 settings, from Lo to Hi) can be carried out by using the Fan Speed selection button.

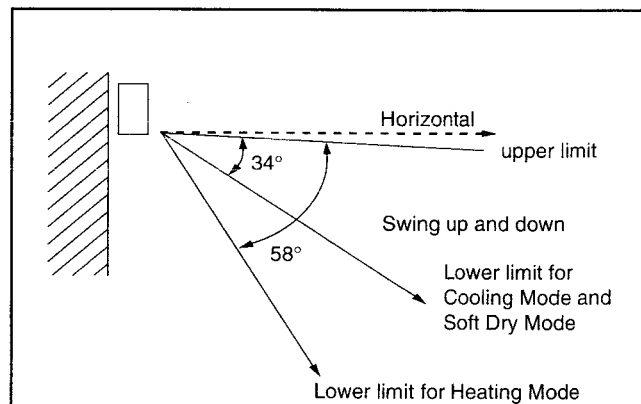
Fan Speed		High Speed ↔ Low Speed								
No.		8	7	6	5	4	3	2	1	0
Cooling	Manual		○	○	○					
	Auto		○	○						
	Sleep					○				
Soft Dry							○			○
Heating	Manual	○		○	○	○	○			○
	Auto			○	○	○	○			○
	Sleep					○	○			○
Voltage to Fan Motor Drive Transistor (V)	CS-A70K	21.0	21.0	18.6	17.0	15.8	11.0	11.0	7.2	0
	CS-A90K	26.7	25.9	21.5	18.1	15.8	11.0	11.0	7.2	0
	CS-A120K	32.0	31.0	26.0	22.5	21.5	16.5	11.0	7.2	0
		SHi	Hi	Me	Lo	Lo-	SLo	MID START	START	STOP

Operation Details

8) Airflow Direction Control

Airflow Direction Auto-Control

- When set a Airflow Direction Auto-Control with remote control, the louver swings up and down as shown in the diagram.
- The louver does not swing when the Indoor Fan stops during operation.
- When stopped with remote control, the discharge vent is closed with the louver.

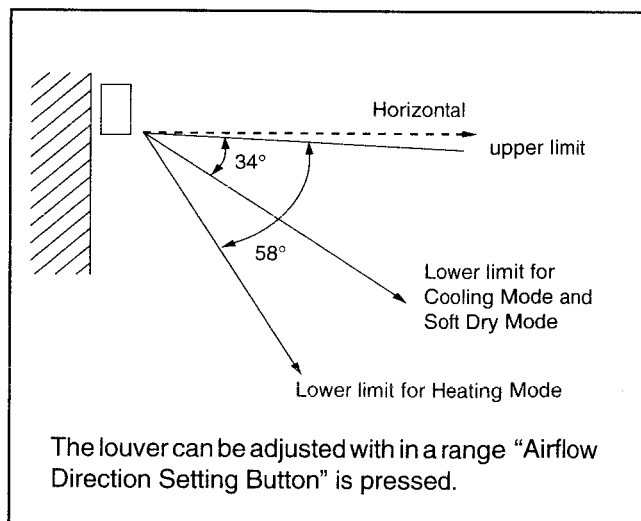


※ The left and right airflow direction louvers can be adjusted manually.

- ※1 There is no swinging while indoor fan is stopped during Cooling and Soft Dry operation.
- ※2 In Heating operation, when the indoor heat exchanger temperature rises to 38°C, the airflow direction is changed from upper limit to lower limit. When the indoor heat exchanger temperature falls to 35°C, the airflow direction is changed from lower limit to upper limit.

Airflow Direction Manual Control

- When the airflow direction set button is pressed, the automatic airflow is released and the airflow direction louver move up and down in the range shown in the diagram.
The louver can be stopped by releasing the button at the desired louver position.
- When the remote control is used to stop the operation, the discharge vent is closed with airflow direction louver.



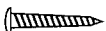
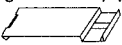
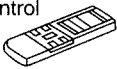
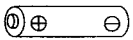
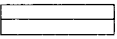
※ The left and right airflow direction louvers can be adjusted manually.

9) Delay ON Timer Control

- When the Delayed ON Timer is set by using the remote control, the unit will start operate slightly before the set time, so that the room will reach nearly to the set temperature by the desired time.
- For Cooling and Soft Dry mode, the operation will start 15 minutes before the set time.
- For Heating mode, the operation will start 30 minutes before the set time.
- For Automatic mode, the indoor fan will operate at SLo speed for 20 seconds 30 minutes before the set time to detect the intake air temperature to determine the operation mode. The operation indication lamp will blink at this time.

Installation Information

Attached accessories

No.	Accessories part	Qty.	No.	Accessories part	Qty.
1	Installation plate 	1	6	Drain elbow 	1
2	Installation plate fixing screw 	4	7	Clamping cover of piping 	1
3	Remote control 	1	8	Vinyl tape 	3
4	Battery 	2	9	Vinyl tape 	1
5	Air purifying filter 	2			

Accessories: Flaring piping kit

CZ-3F5, 7AEN (A70KE, A90KE)

CZ-4F5, 7, 10 AN (A120KE)

SELECT THE BEST LOCATION

INDOOR UNIT

- There should not be any heat source or steam near the unit.
- There should not be any obstacles blocking the air circulation.
- A place where air circulation in the room is good.
- A place where drainage can be easily done.
- A place where noise prevention is taken into consideration.
- Do not install the unit near the door way.
- Ensure the spaces indicated by arrows from the wall, ceiling, fence or other obstacles.
- Indoor unit of this room air conditioner shall be installed on the wall in a height of at least 2.3 m.

OUTDOOR UNIT

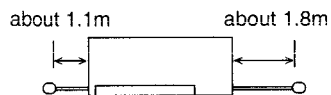
- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the condenser is not obstructed.
- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other obstacles.
- Do not place any obstacles which may cause a short circuit of the discharged air.
- If piping length is over the rated length, additional refrigerant should be added as shown in the table.

MODEL	Piping size		Rated Length	Max. Elevation (m)	Max. Piping Length (m)	Additional Refrigerant (g/m)
	Gas	Liquid				
A70KE	3/8"	1/4"	7	5	10	15
A90KE	3/8"	1/4"	7	5	10	30
A120KE	1/2"	1/4"	10	5	15	30

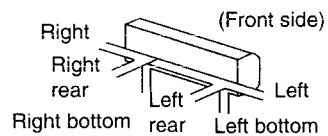
Installation Information

Indoor / Outdoor unit installation diagram

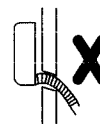
Length of power supply cord



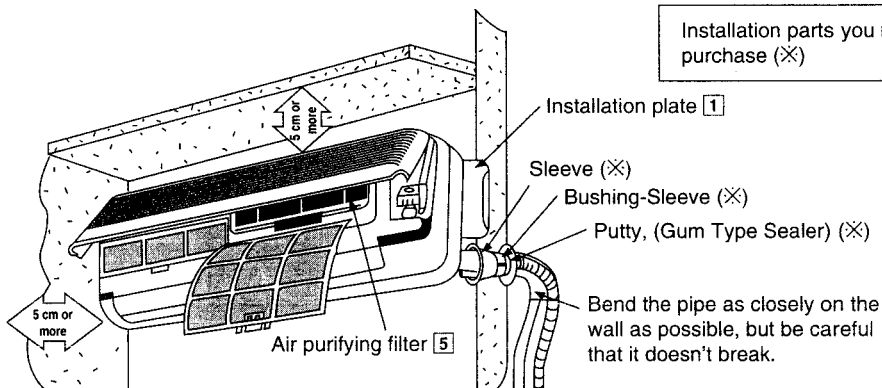
Piping direction



Attention not to bend up drain hose



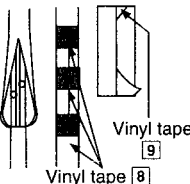
Installation parts you must purchase (X)



(Left and right are identical)

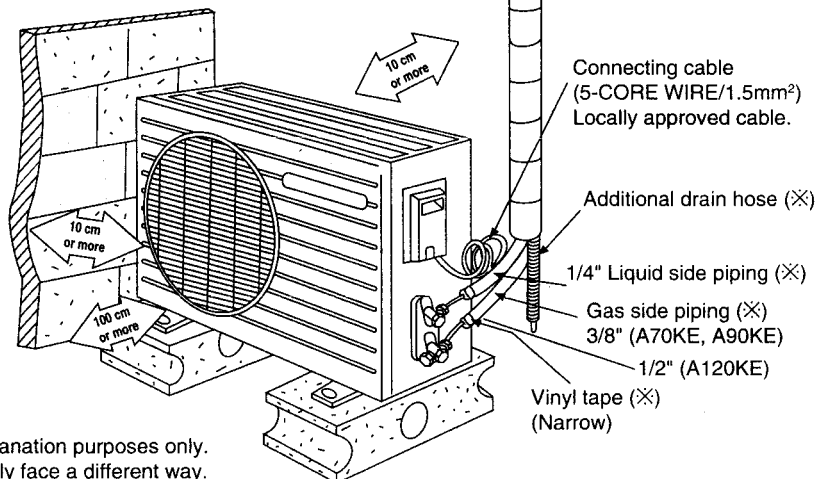
Insulation of piping connection

- Carry out installation after checking for gas leaks.
- After securing with three of the vinyl tape 8, wrap with vinyl tape 9.



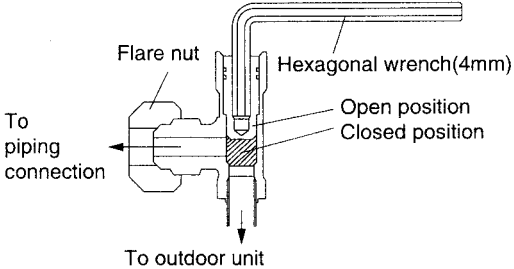
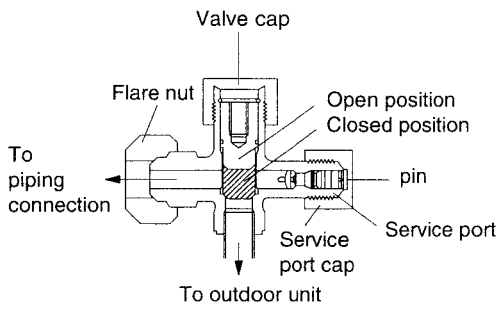
Vinyl tape (Wide) (X)

- Apply after carrying out a drainage test.
- To carry out the drainage test, remove into the heat exchanger. To carry out the drainage test, remove into the heat exchanger.



- This illustration is for explanation purposes only. The indoor unit will actually face a different way.

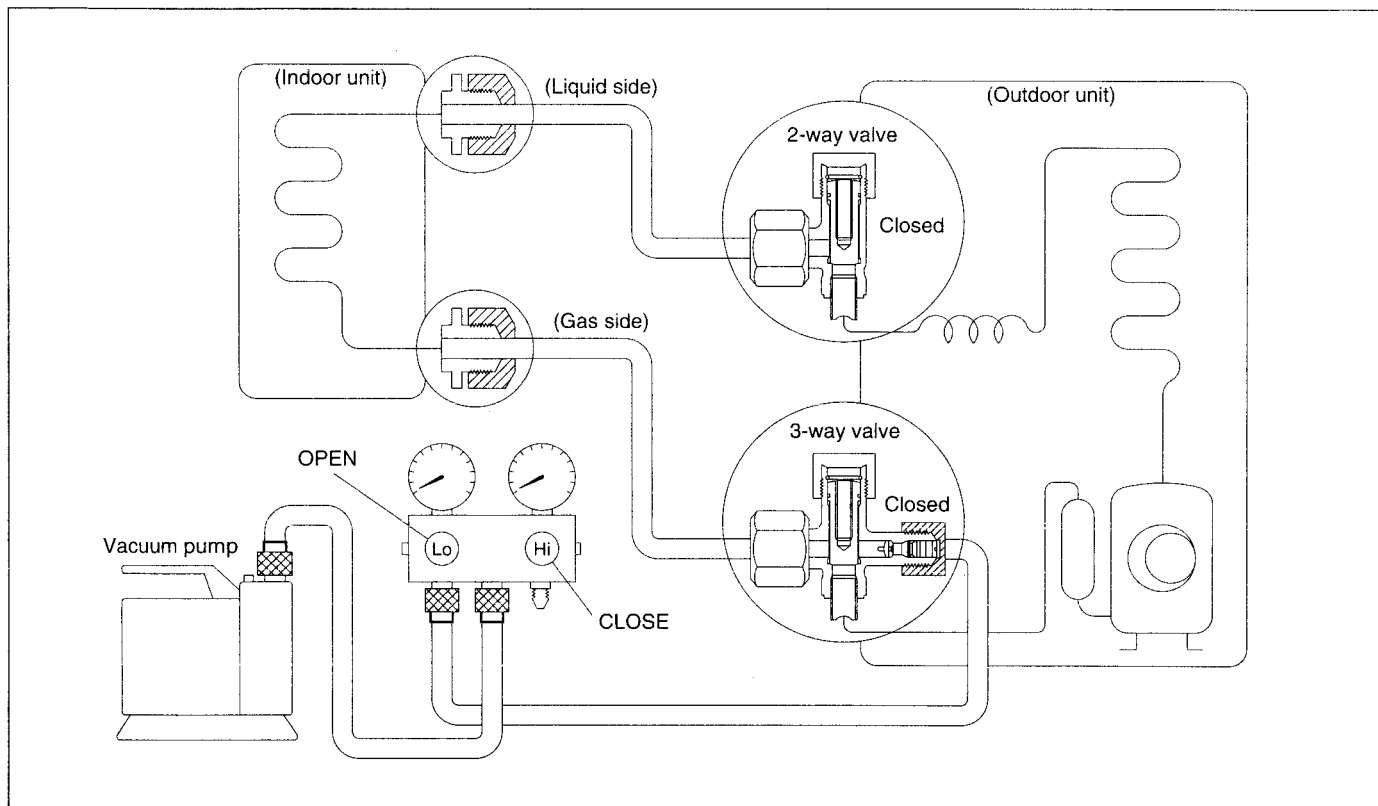
2-way • 3-way Valve

	2-way Valve (Liquid Side)	3-way Valve (Gas Side)	
			
Works	Shaft Position	Shaft Position	Service Port
Shipping	Close (With valve cap)	Closed (With valve cap)	Closed (With cap)
Evacuation (Installation and Re-installation)	Closed (Counter-Clockwise)	Closed (Clockwise)	Open (Push-pin)
Operation	Open (With valve cap)	Open (With valve cap)	Closed (With cap)
Pumping down (Transferring)	Closed (Clockwise)	Open (Counter-clockwise)	Open (Connected manifold gauge)
Evacuation (Servicing)	Open	Open	Open With vacuum pump
Gas charging (Servicing)	Open	Open	Open (With charging cylinder)
Pressure check (Servicing)	Open	Open	Open (Connected manifold gauge)
Gas releasing (Servicing)	Open	Open	Open (Connected manifold gauge)

1 Evacuation of Installation

WHEN INSTALLING AN AIR CONDITIONER, BE SURE TO EVACUATE THE AIR INSIDE THE INDOOR UNIT AND PIPES in the following procedure.

If air remain in the indoor unit and refrigeration pipes, it will affect the compressor, reduce to cooling capacity, and could lead to a malfunction.



Procedure:

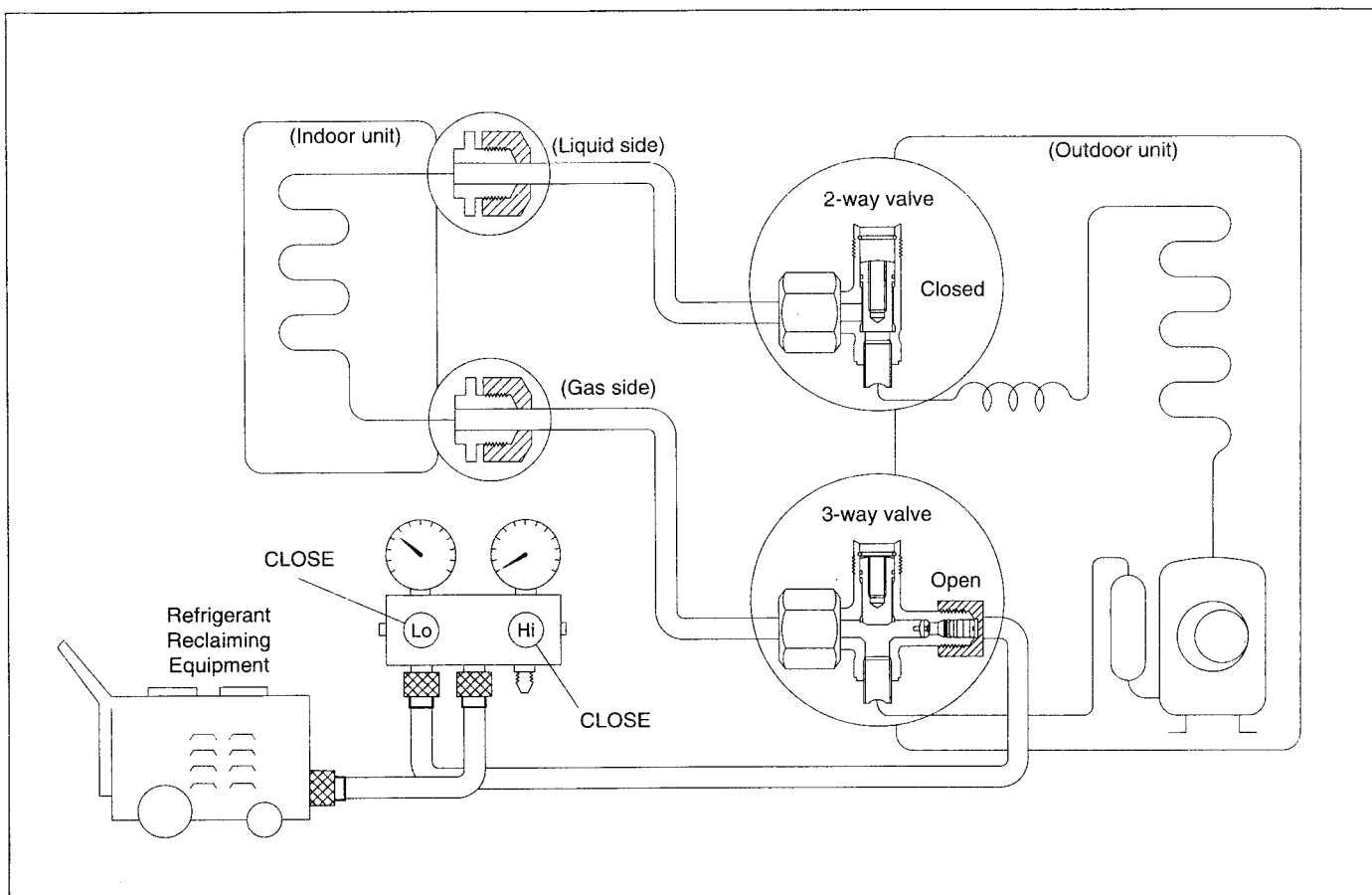
- (1) Connect a charging hose with a push pin to the Low side of a charging set and the service port of a 3-way valve.
 - Be sure to connect the end of the charging hose with the push pin to the service port.
- (2) Connect the centre hose of the charging set to a vacuum pump.
- (3) Turn on the power switch of the vacuum pump and make sure that the needle in the gauge moves from 0 MPa (0 cmHg) to -0.1 MPa (-76 cmHg). Then evacuate the air for approximately ten minutes.
- (4) Close the Low side valve of the charging set and turn off the vacuum pump. Make sure that the needle in the gauge does not move after approximately five minutes.
BE SURE TO TAKE THIS PROCEDURE IN ORDER TO AVOID GAS LEAKAGE.
- (5) Disconnect the charging hose from the vacuum pump and from the service port of the 3-way valve.
- (6) Tighten the service port cap at a torque of 18 N•m with a torque wrench.
- (7) Remove the valve caps of the 2-way valve and the 3-way valve. Position both of the valves to "open" using a hexagonal wrench (4 mm).
- (8) Mount the valve caps onto the 2-way and 3-way valves.
 - Be sure to check for gas leakage.

Caution

If gauge needle does not move from 0 cmHg to -76 cmHg in step (3) above, take the following measures:

If the leaks stop when the piping connections are tightened further, continue working from step (3).
 If the leaks do not stop when the connections are retightened, repair the location of the leak.

2 Pumping down



Procedure:

(1) Confirm that both the 2-way and 3-way valves are set to the opened position.

- Remove the valve stem caps and confirm that the valve stems are in the opened position.
- Be sure to use a hexagonal wrench to operate the valve stems.

(2) Operate the unit for 10 to 15 minutes.

(3) Stop operation and wait for 3 minutes, then connect the charge set to the service port of the 3-way valve.

- Connect the charge hose with the push pin to the Gas service port.

(4) Air purging of the charge hose.

- Open the low-pressure valve on the charge set slightly to purge air from the charge hose.

(5) Set the 2-way valve to the closed position.

(6) Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 0 MPa (0 kg/cm²G).

If the unit cannot be operated at the cooling condition (weather is rather cool), short the Pumping Down pins on the Main Control P.C.B.

(Simply press the pumping down button if it is equipped.)

So that the unit can be operated.

(7) Immediately set the 3-way valve to the closed position.

- Do this quickly so that the gauge ends up indicating 0.1 MPa (1 kg/cm²G) to 0.3 MPa (3 kg/cm²G)

(8) Use refrigerant reclaiming equipment to collect refrigerant from indoor unit and pipes.

(9) Disconnect the charge set, and mount the 2-way and 3-way valve's stem caps and the service port caps.

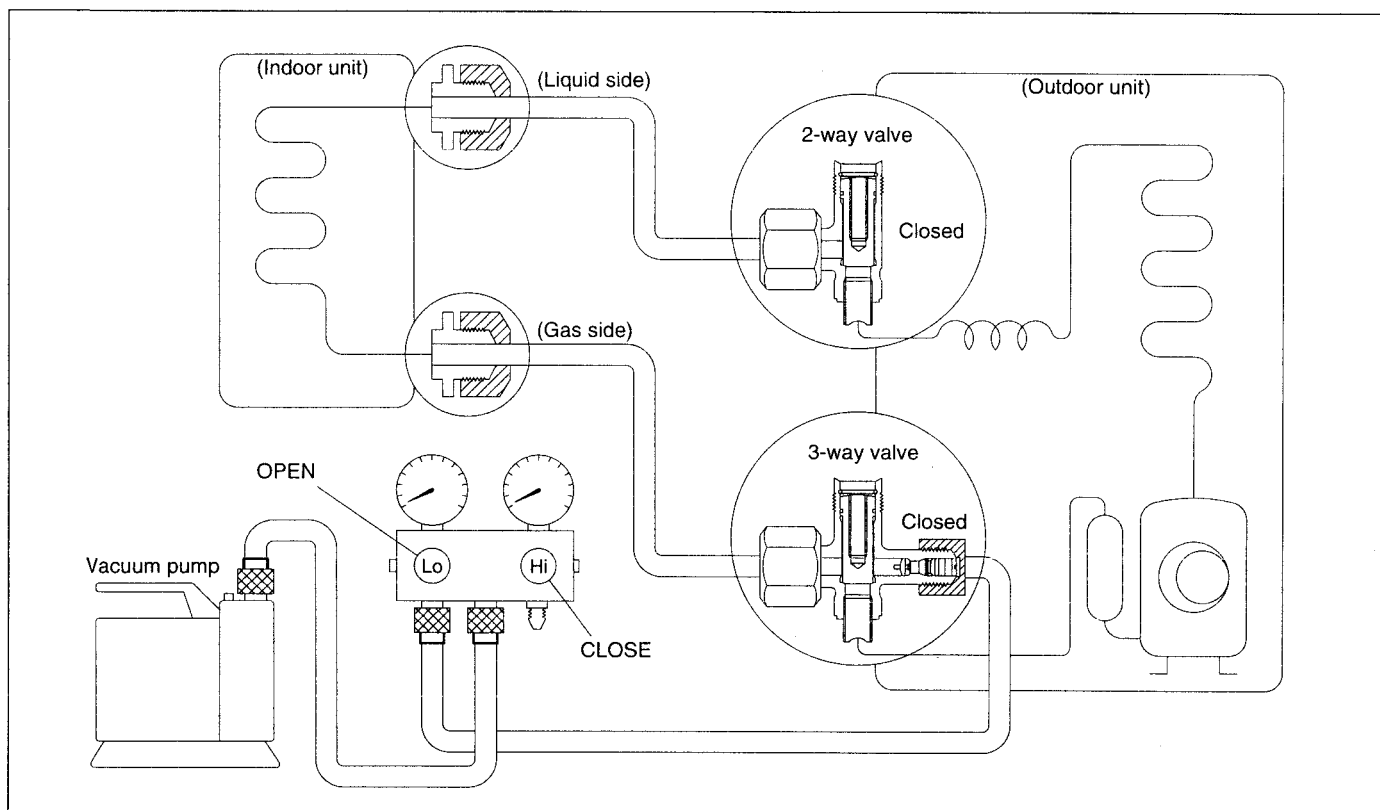
- Use a torque wrench to tighten the service port cap to a torque of 18 N•m.
- Be sure to check for gas leakage.

(10) Disconnect pipes from indoor unit and outdoor unit.

3 Evacuation of Re-installation

WHEN RE-INSTALLING AN AIR CONDITIONER, BE SURE TO EVACUATE THE AIR INSIDE THE INDOOR UNIT AND PIPES in the following procedure.

If air remain in the indoor unit and refrigeration pipes, it will affect the compressor, reduce to cooling capacity, and could lead to a malfunction.



Procedure:

- (1) Connect a charging hose with a push pin to the Low side of a charging set and the service port of the 3-way valve.
 - Be sure to connect the end of the charging hose with the push pin to the service port.
- (2) Connect the center hose of the charging set to a vacuum pump.
- (3) Turn on the power switch of the vacuum pump and make sure that the needle in the gauge moves from 0 MPa (0 cmHg) to -0.1 MPa (-76 cmHg). Then evacuate the air for approximately ten minutes.
- (4) Close the Low side valve of the charging set and turn off the vacuum pump. Make sure that the needle in the gauge does not move after approximately five minutes.
BE SURE TO TAKE THIS PROCEDURE IN ORDER TO AVOID GAS LEAKAGE.
- (5) Disconnect the charging hose from the vacuum pump.
- (6) Charge the pipes and indoor unit with gas refrigerant from 3-way valve service port, and then discharge the refrigerant until low side (gas side) gauge needle indicates 0.3 MPa (3 kg/cm²)
- (7) Tighten the service port cap at a torque of 18N·m with a torque wrench.
- (8) Remove the valve caps of the 2-way valve and the 3-way valve. Position both of the valves to "open" using a hexagonal wrench (4 mm).
- (9) Mount valve caps onto the 2-way and 3-way valves.
 - **BE SURE TO USE REFRIGERANT RECLAIMING EQUIPMENT WHILE DISCHARGING THE REFRIGERANT.**
 - Purge the air from charge set's centre hose.
 - Be sure to check for gas leakage.

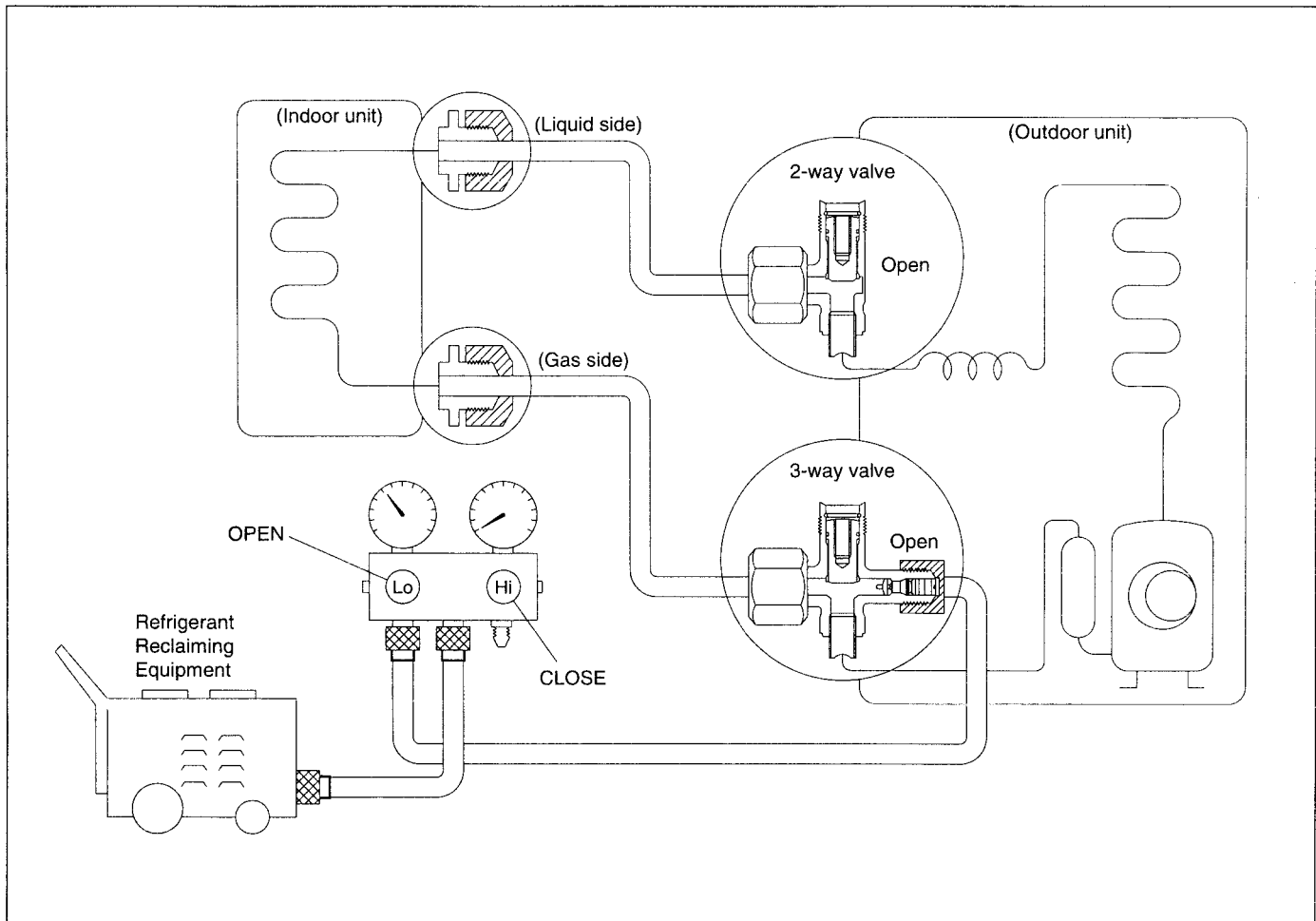
Caution

If gauge needle does not move from 0 MPa (0 cmHg) to -0.1 MPa (-76 cmHg) in step (3) above, take the following measures:

If the leaks stop when the piping connections are tightened further, continue working from step (3).
If the leaks do not stop when the connections are retightened, repair the location of the leak.

4 Balance refrigerant of the 2-way, 3-way valves

(Lack of refrigerant in the refrigeration cycle)

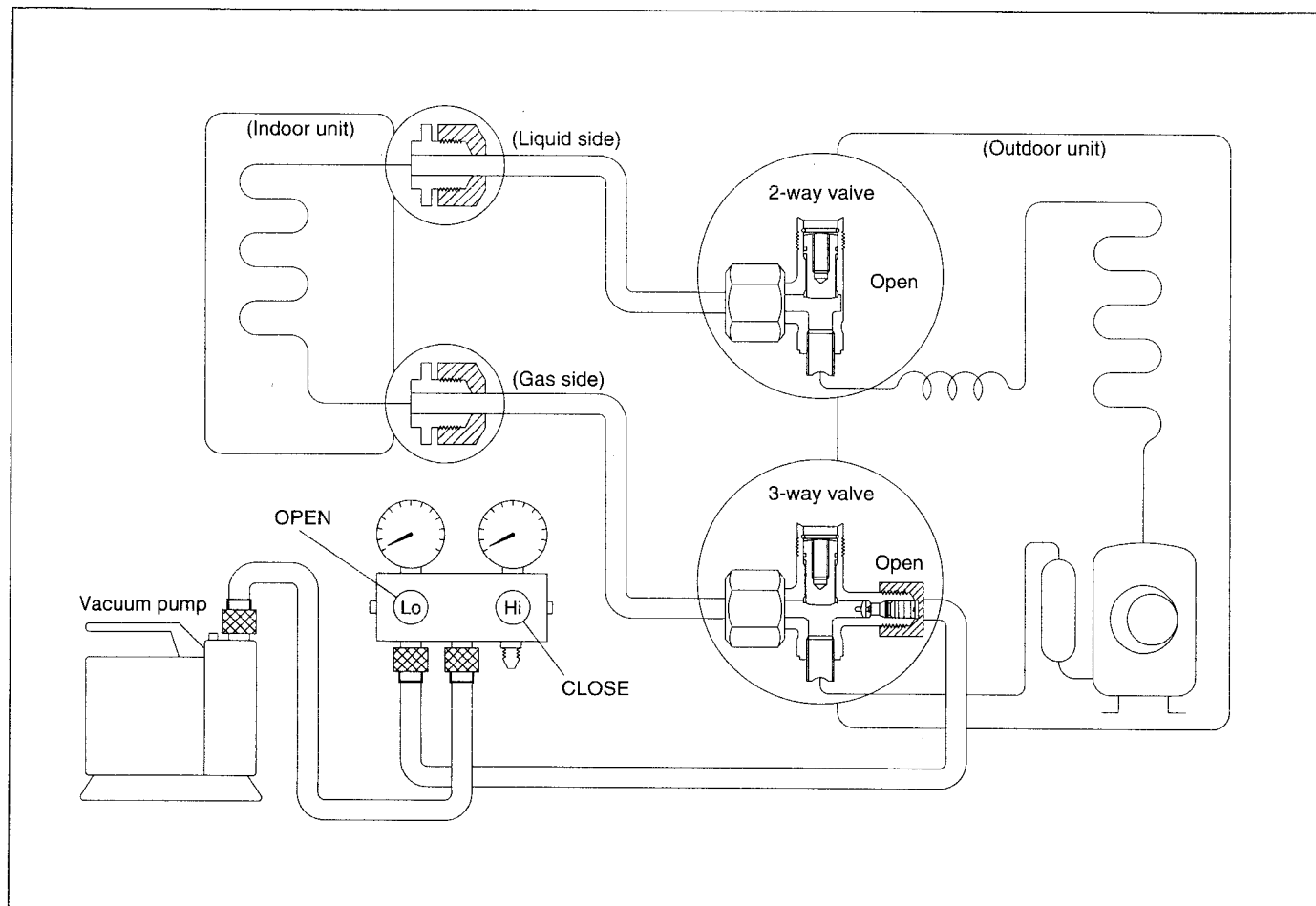


Procedure:

- (1) Confirm that both the 2-way and 3-way valves are set to the open position.
- (2) Connect the charge set to the 3-way valve's service port.
 - Leave the valve on the charge set closed.
 - Connect the charge hose with the push-pin to the service port.
- (3) Connect the charge set's centre hose to refrigerant reclaiming equipment.
 - Purge the air from charge hose.
- (4) Open the valve (Low side) on the charge set and discharge the refrigerant until the gauge indicates 0.05 MPa (0.5 kg/cm²G) to 0.1 MPa (1 kg/cm²G).
 - If there is no air in the refrigeration cycle (the pressure when the air conditioner is not running is higher than 0.1 MPa (1 kg/cm²G), discharge the refrigerant until the gauge indicates 0.05 MPa (0.5 kg/cm²G) to 0.1 MPa (1 kg/cm²G). If this is the case, it will not be necessary to apply a evacuation.
 - Discharge the refrigerant gradually; if it is discharged too suddenly, the refrigeration oil will also be discharged.
- (5) Turn on refrigerant reclaiming equipment .

5 Evacuation

(No refrigerant in the refrigeration cycle)

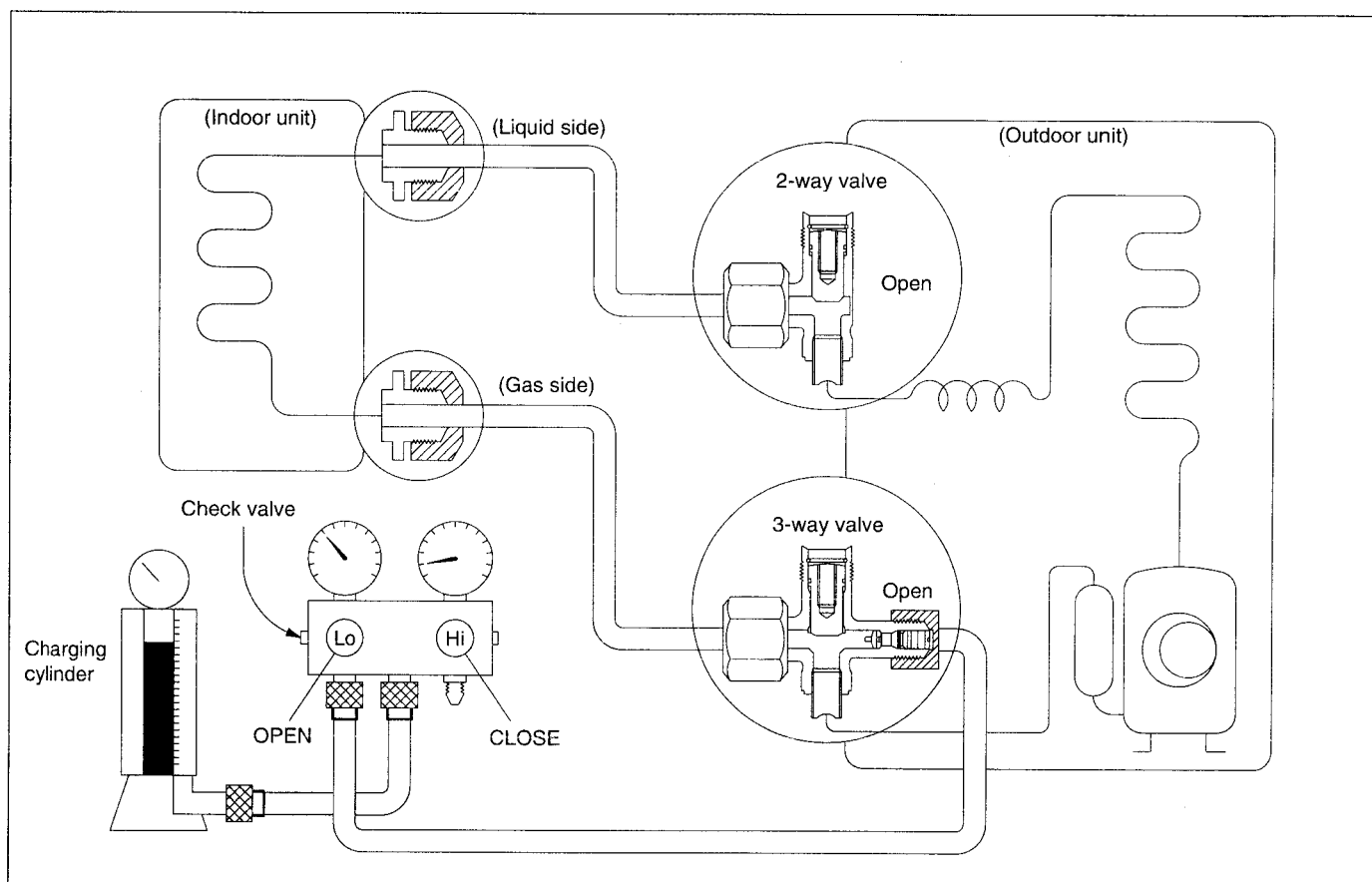


Procedure:

- (1) Connect the vacuum pump to the charge set's centre hose.
- (2) Evacuation for approximately one hour.
 - Confirm that the gauge needle has moved toward -0.1 MPa (-76 cmHg) [vacuum of 4 mmHg or less.]
- (3) Close the valve (Low side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).
- (4) Disconnect the charge hose from the vacuum pump.
 - Vacuum pump oil
If the vacuum pump oil becomes dirty or depleted, replenish as needed.

6 Gas charging

(After Evacuation)



Procedure:

(1) Connect the charge hose to the charging cylinder.

- Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder.

(2) Purge the air from the charge hose.

- Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).

(3) Open the valve (Low side) on the charge set and charge the system with liquid refrigerant.

- If the system cannot be charged with the specified amount of refrigerant, it can be charged with a little at a time (approximately 150 g each time) while operating the air conditioner in the cooling cycle; however, one time is not sufficient, wait approximately 1 minute and then repeat the procedure. (pumping down-pin)

This is different from previous procedures. Because you are charging with liquid refrigerant from the gas side, absolutely do not attempt to charge with large amount of liquid refrigerant while operating the air conditioner.

(4) Immediately disconnect the charge hose from the 3-way valve's service port.

- Stopping partway will allow the refrigerant to be discharged.
- If the system has been charged with liquid refrigerant while operating the air conditioner, turn off the air conditioner before disconnecting the hose.

(5) Mount the valve stem caps and the service port cap.

- Use torque wrench to tighten the service port cap to a torque of 18 N•m.
- Be sure to check for gas leakage.

Servicing Information

● Inspection points for the Indoor Electronic Controller

1. The Electronic Controller, a signal Receiver and an Indicator can be seen by removing the Front Grille and Control Board Cover, as shown in the Fig 1.

[A↔ B] selection switch [SW1]
(Used when there are two units in one room)

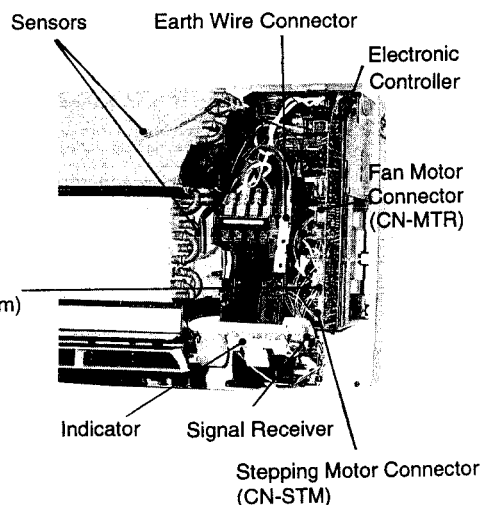


Fig 1.

● Indoor Fan Motor removal procedure

1. Remove the connector CN-MTR (GREEN) of Fan Motor and connector CN-STM (GREEN) of stepping motor from the electronic controller. Release the earth wire (YELLOW-GREEN) from the control board and sensors from its holders. (Refer Fig 1.)
2. Remove the Control Board
The Control Board can be removed by releasing the top, left and right tabs shown in Fig 2, 3, 4.

Releasing the 2 right tabs by pressing down the top tab and pushing up the bottom tab.

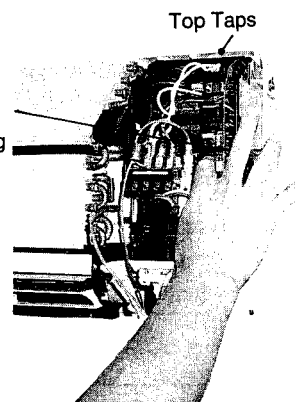


Fig 2.

Releasing the 2 left tabs by pressing down the top tab and pushing up the bottom tabs

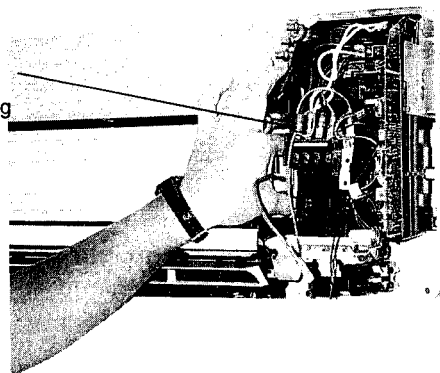


Fig 3.

Remove the Control Board

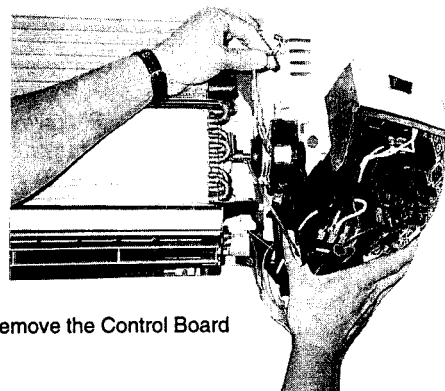


Fig 4.

Servicing Information

3. Remove the Fan Motor

Loosen the Fan Motor securing screw at the junction with Cross Flow Fan. (Fig 5.)

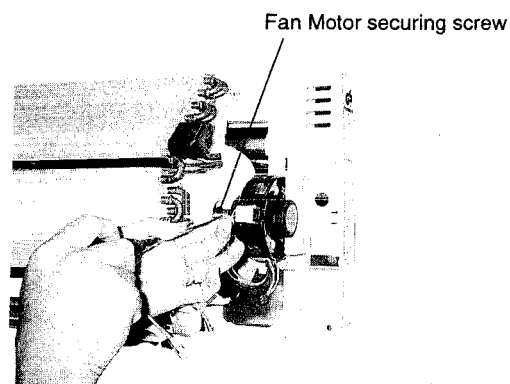


Fig 5.

Remove the particular piece and the Fan Motor can be taken off as shown in Fig 6. and 7.

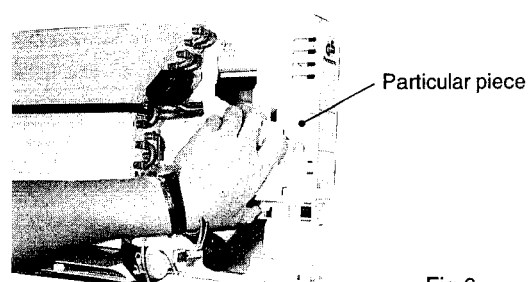
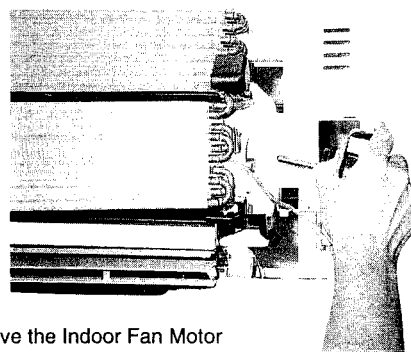


Fig 6.



Remove the Indoor Fan Motor

Fig 7.

4. To fix the Indoor Fan Motor, ensure that the Fan Motor securing screw is positioned at the rear side and the Fan Motor lead wire is positioned parallelly with Fan Motor. (Fig 8.)

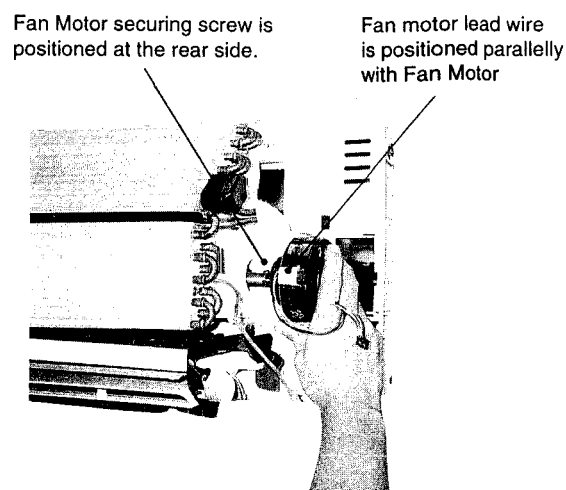


Fig 8.

Servicing Information

● Cross Flow Fan Removal Procedure

1. Remove the Indoor Fan Motor.
(Refer to the removal procedure of the Indoor Fan Motor.)

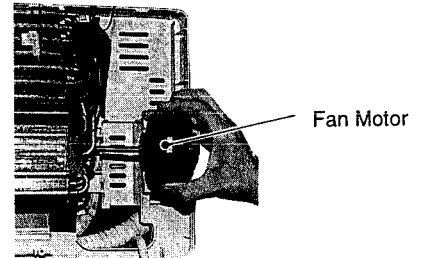


Fig 9.

2. Remove the Air Discharge Grille by taking off the screws that hold the Air Discharge Grille and then pull the Air Discharge Grille in a down and forward direction.

3. Pull off the Bearing at the left of the Cross Flow Fan.
(Fig 10.)

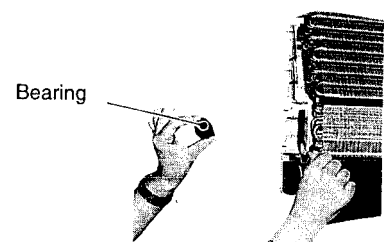


Fig 10.

4. Take off the mounting tab at the left of the Heat Exchanger, pull the Heat Exchanger forward (left side) and remove the Cross Flow Fan.
(Fig 11.)

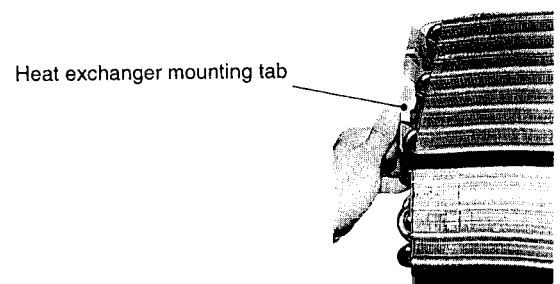


Fig 11.

Servicing Information

• Outdoor Unit Servicing

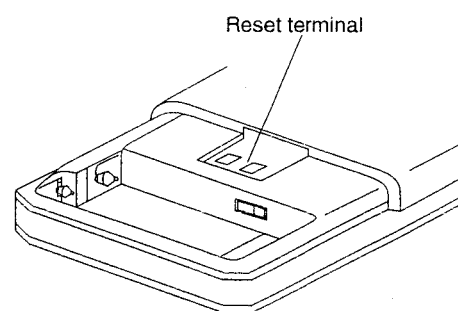
Outdoor Unit can be serviced by just removing the outdoor chassis front cover as shown in the Fig 12.



Fig 12.

• Remote Control Reset

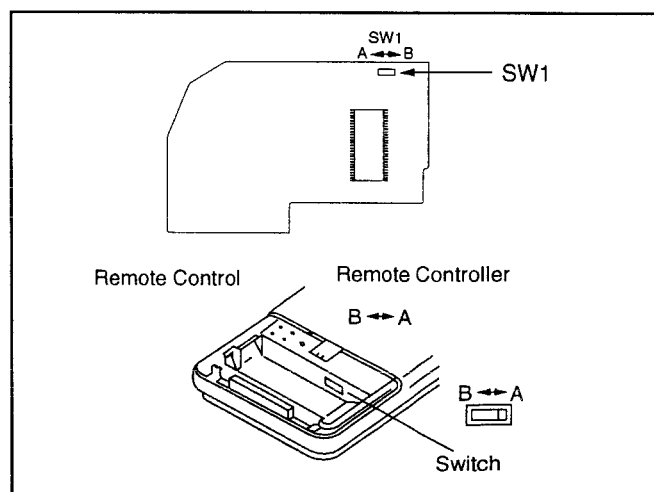
When the batteries are inserted for the first time, or the batteries are replaced, all the indications will blink and the remote control might not work. If this happens, remove the back cover of the remote control and you will find a resetting terminal, and by shorting it with a minus screwdriver, it will return to normal.



• Changing the wireless remote control transmission code

When two indoor units are installed in the same room, in order to prevent operating errors caused by using two remote controls, set up the remote control [B ↔ A] switch (SW1).

The unit is set to A when it is shipped.



- By adding a jumper wire to the remote control side and a carbon resistor (1/4 W, 10 kΩ) to the indoor printed circuit board, it is possible to select from 4 types of transmission codes including the condition at time of delivery condition (1).

	Remote control		Indoor printed circuit board		Note
	Switch SW B ↔ A	J – B	Switch SW1	RX	
1	A	———	A	———	At product delivery
2	B	———	B	———	
3	A	Jumper wire	A	10kΩ	
4	B	Jumper wire	B	10kΩ	

Troubleshooting Guide

Refrigeration cycle system

In order to diagnose malfunctions, make sure that there are no electrical problems before inspecting the refrigeration cycle. Such problems include insufficient insulation, problem with the power source, malfunction of a compressor and a fan.

The normal outlet air temperature and pressure of the refrigeration cycle depends on various conditions, the standard values for them are shown in the table to the right.

Normal Pressure and Outlet Air Temperature (Standard)

	Gas pressure MPa (kg/cm ² G)	Outlet air temperature (°C)
Cooling mode	0.4 ~ 0.6 (4 ~ 6)	12 ~ 16
Heating mode	1.5 ~ 2.1 (15 ~ 21)	36 ~ 45

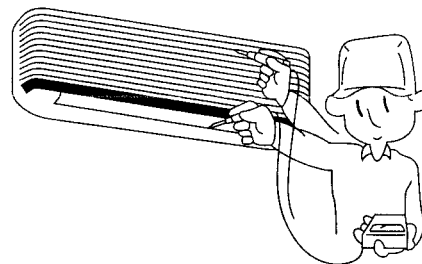
★ Condition: Indoor fan speed; High
Outdoor temperature 35°C at the cooling mode
and 7°C at the heating mode

Difference in the intake
and outlet
air temperatures

More than 8°C
(15 minutes after an
operation is started.)
at the cooling mode
More than 14°C
(15 minutes after an
operation is started.)
at the heating mode

Normal

• Measuring the air temperature difference



Less than 8°C at the cooling mode
Less than 14°C at the heating mode

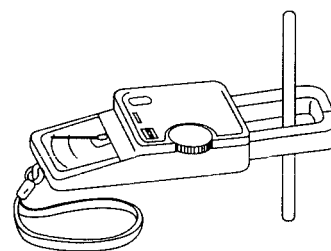
Value of electric
current during operation

Higher than specified

Dusty condenser
preventing heat radiation

• Measuring electric current during operation

Excessive amount
of refrigerant



Lower than specified

Gas side
pressure

Cooling Mode

High

Inefficient compressor

Low

Insufficient refrigerant

Low

Clogged strainer or
capillary tube

Heating Mode

Low

Inefficient compressor

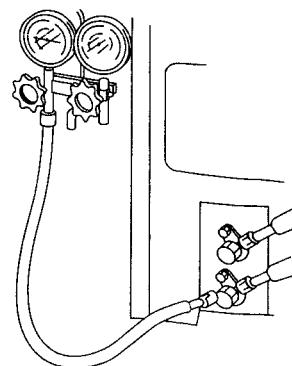
Low

Insufficient refrigerant

Low

Clogged strainer or
capillary tube

• Measuring gas side pressure



Troubleshooting Guide

1. Relationship between the condition of the air conditioner and pressure and electric current

Condition of the air conditioner	Cooling Mode			Heating Mode		
	Low Pressure	High Pressure	Electric current during operation	Low Pressure	High Pressure	Electric current during operation
Insufficient refrigerant (gas leakage)	↘	↘	↘	↘	↘	↘
Clogged capillary tube or Strainer	↘	↘	↘	↘	↘	↘
Short circuit in the indoor unit	↘	↘	↘	↗	↗	↗
Heat radiation deficiency of the outdoor unit	↗	↗	↗	↘	↘	↘
Inefficient compression	↗	↘	↘	↗	↘	↘

- Carry out the measurements of pressure, electric current, and temperature fifteen minutes after an operation is started.

2. Diagnosis methods of a malfunction of a compressor and a 4-way valve

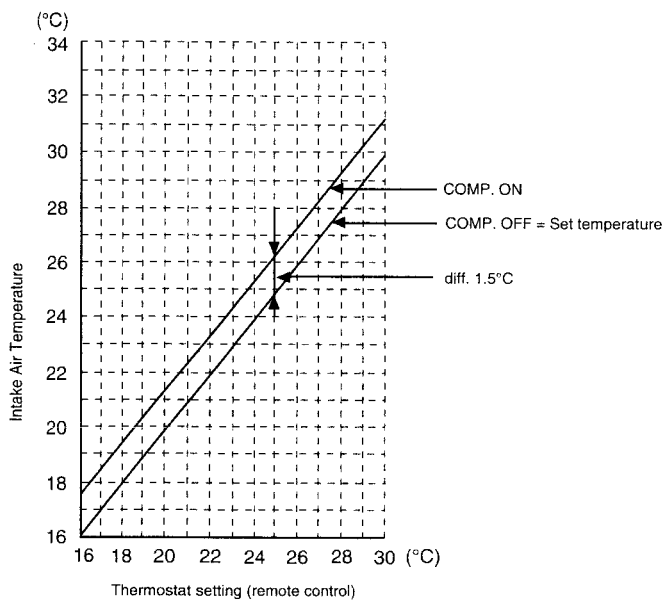
Nature of fault	Symptom
Insufficient compressing of a compressor	• Electric current during operation becomes approximately 20% lower than the normal value. • The discharge tube of the compressor becomes abnormally hot (normally 70 to 90°C). • The difference between high pressure and low pressure becomes almost zero.
Locked compressor	• Electric current reaches a high level abnormally, and the value exceeds the limit of an ammeter. In some cases, a breaker turns off. • The compressor is a humming sound.
Inefficient switches of the 4-way valve	• Electric current during operation becomes approximately 80% lower than the normal value. • The temperature difference between from the discharge tube to the 4-way valve and from suction tube to the 4-way valve becomes almost zero.

Technical Data

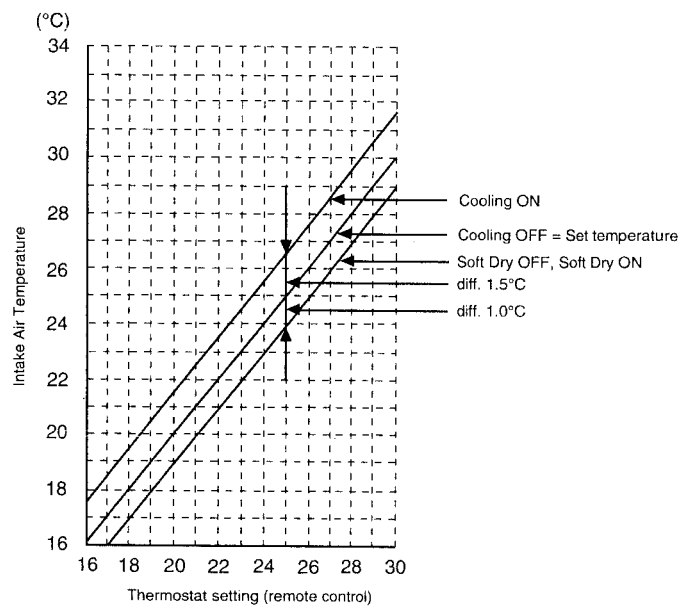
■ Thermostat characteristics

CS-A70KE / CS-A90KE / CS-A120KE

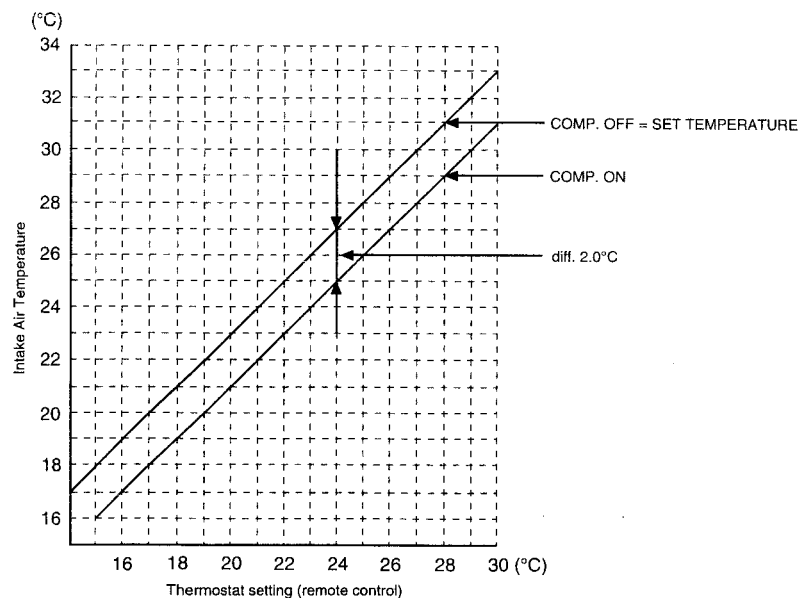
• Cooling



• Soft Dry



• Heating

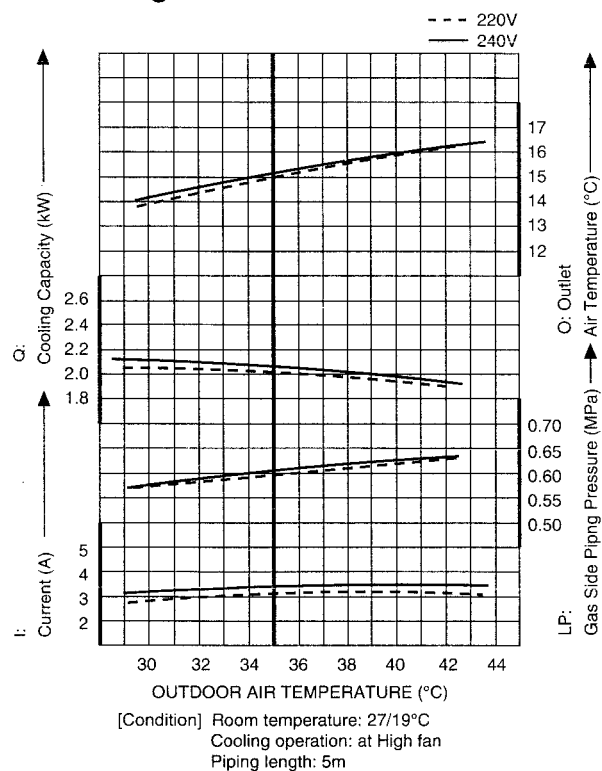


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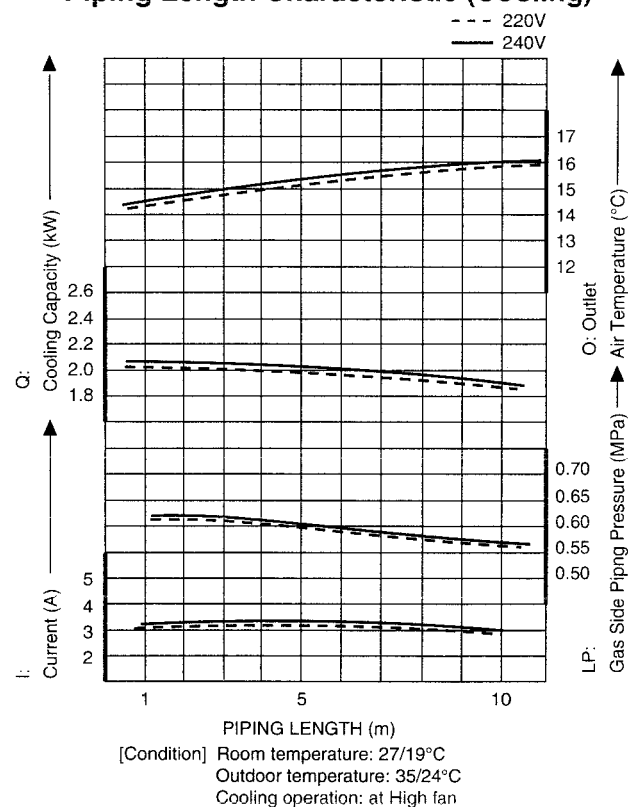
■ Operation characteristics

CS-A70KE / CU-A70KE

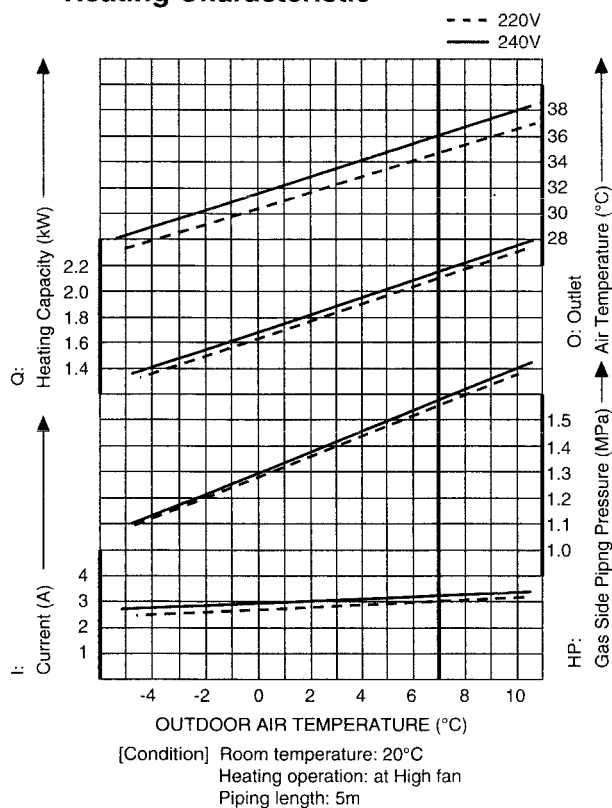
• Cooling Characteristic



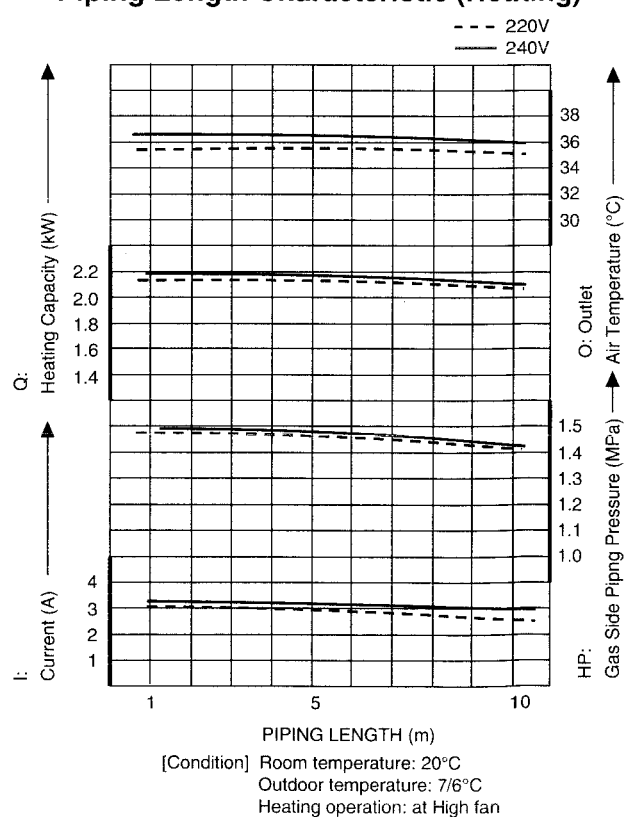
• Piping Length Characteristic (Cooling)



• Heating Characteristic



• Piping Length Characteristic (Heating)

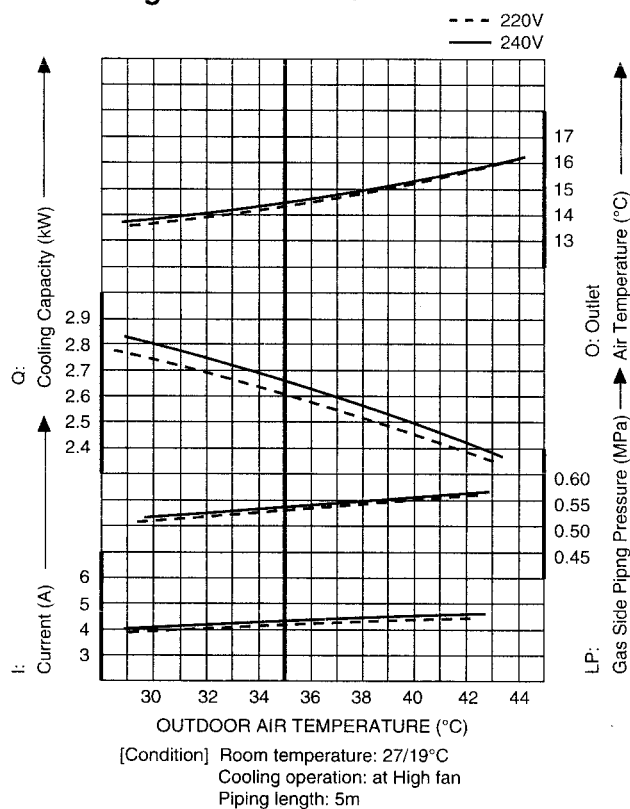


Technical Data

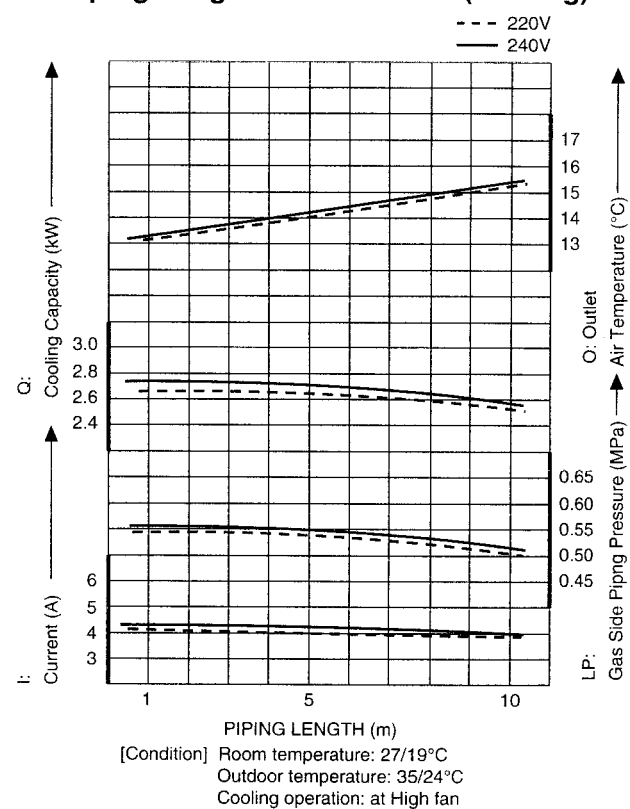
■ Operation characteristics

CS-A90KE / CU-A90KE

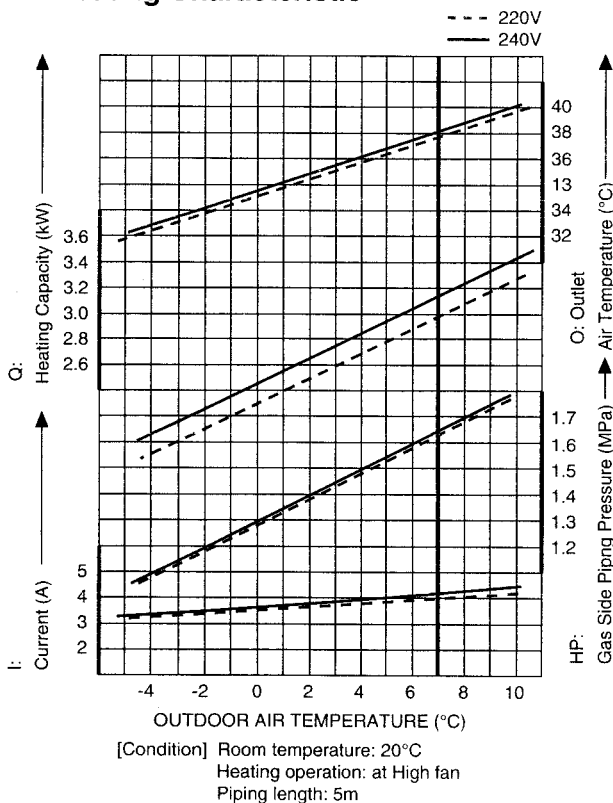
• Cooling Characteristic



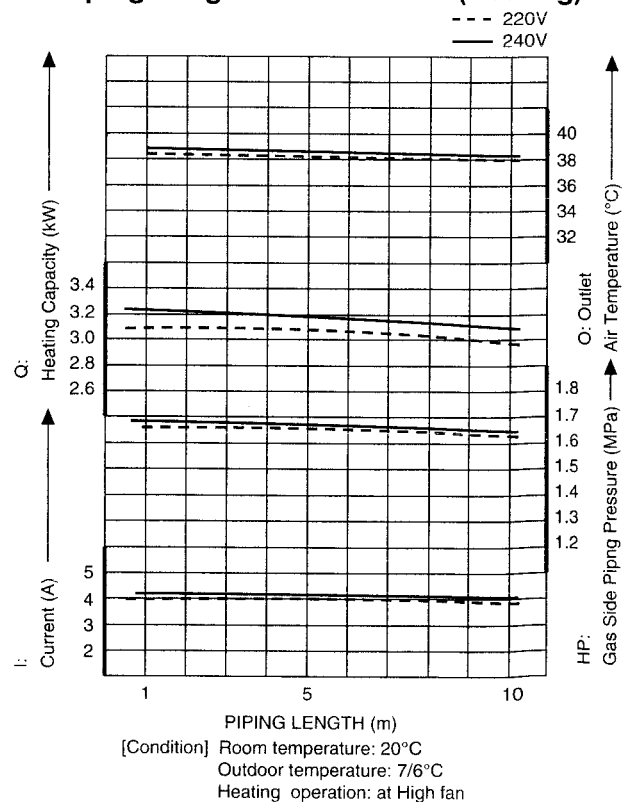
• Piping Length Characteristic (Cooling)



• Heating Characteristic



• Piping Length Characteristic (Heating)

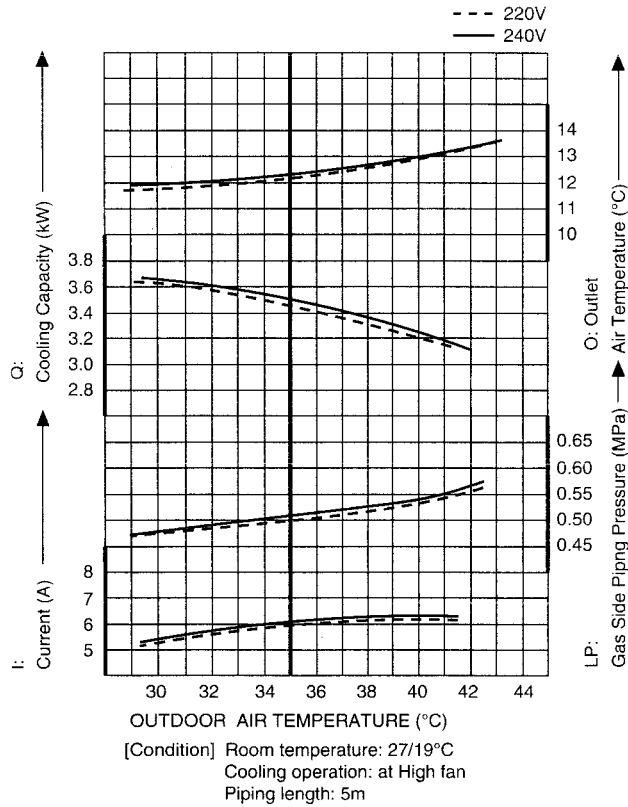


Technical Data

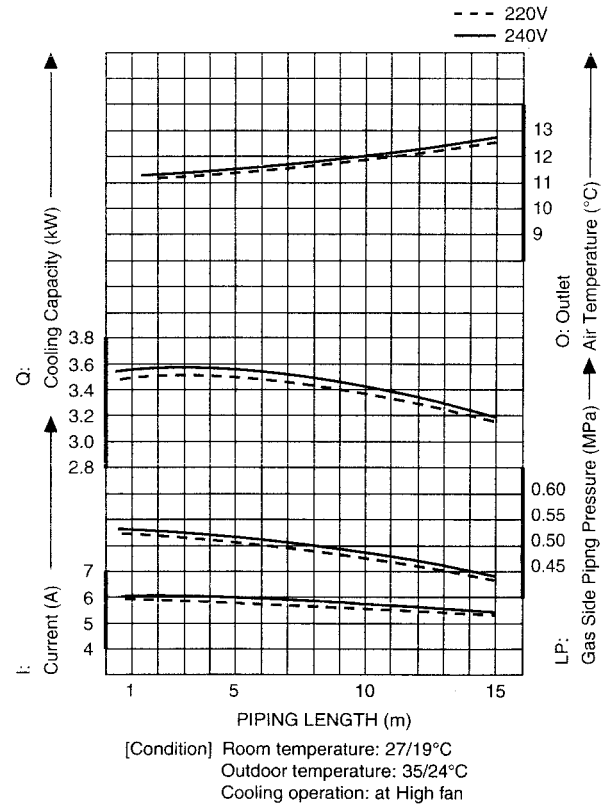
■ Operation characteristics

CS-A120KE / CU-A120KE

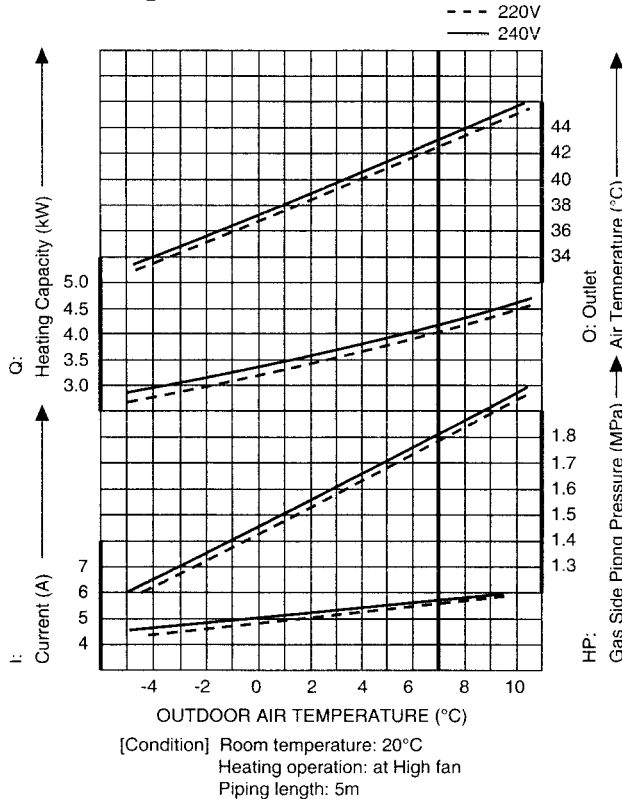
• Cooling Characteristic



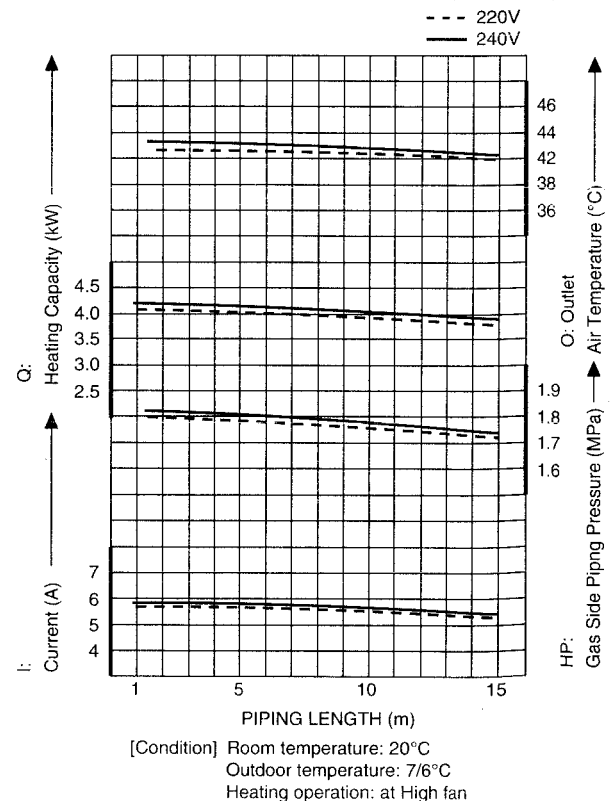
• Piping Length Characteristic (Cooling)



• Heating Characteristic

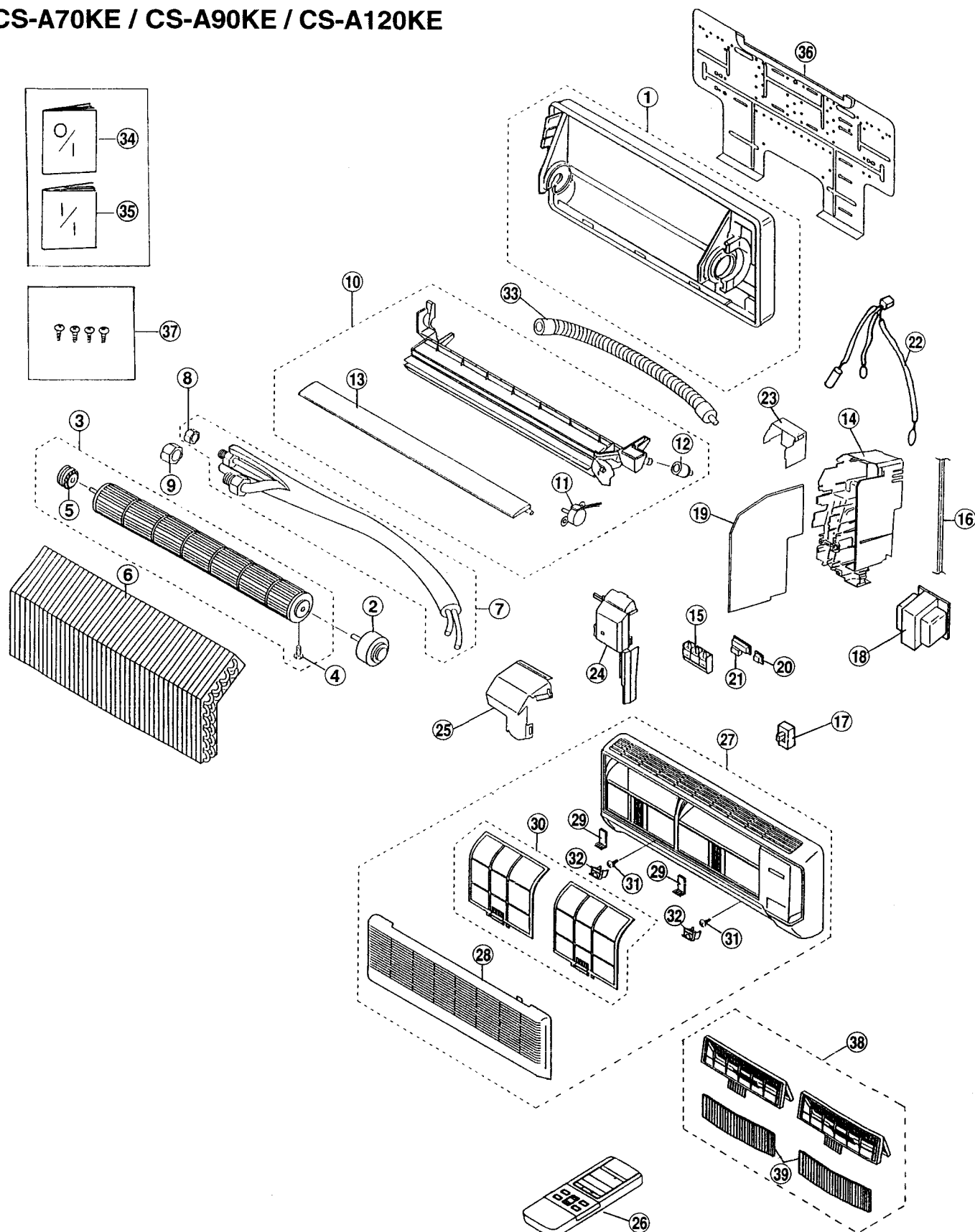


• Piping Length Characteristic (Heating)



Exploded View

CS-A70KE / CS-A90KE / CS-A120KE



Replacement Parts List

<Model: CS-A70KE / CS-A90KE / CS-A120KE>

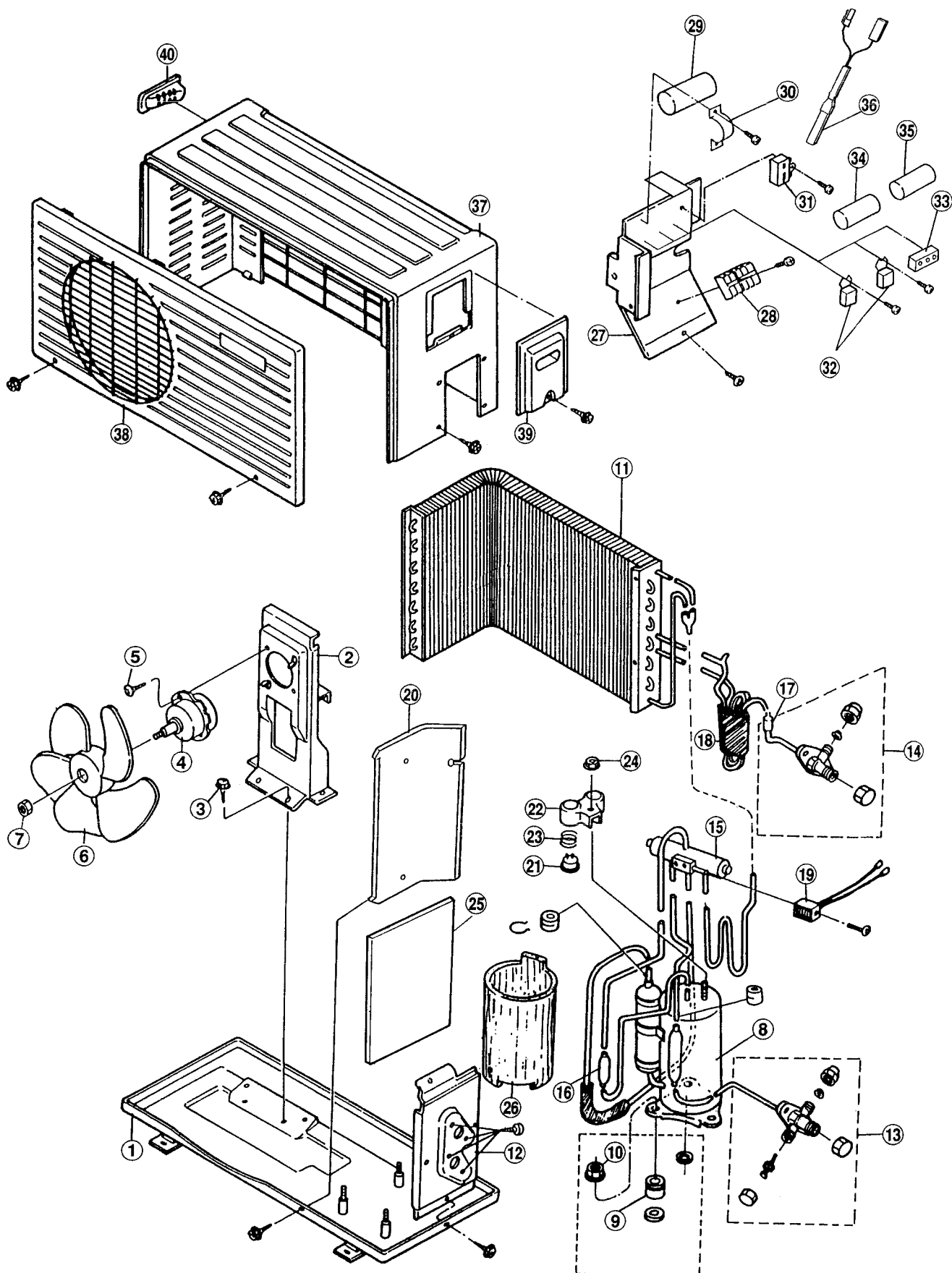
NO.	DESCRIPTION & NAME	QTY	CS-A70KE	CS-A90KE	CS-A120KE	REMARKS
1	CHASSY COMPLETE	1	CWD50C202	←	←	
2	FAN MOTOR	1	CWA98244	←	←	○
3	CROSS FLOW FAN COMPLETE	1	CWH02C053	←	←	
4	SCREW-CROSS FLOW FAN	1	CWH4580304	←	←	
5	BEARING ASS'Y	1	CWH64K007	←	←	
6	EVAPORATOR	1	CWB30C145	←	CWB30C146	
7	TUBE ASS'Y COMPLETE	1	CWT01C237	←	CWT01C238	
8	FLARE NUT (1/4")	1	CWH6002140	←	←	
9	FLARE NUT (1/2") OR (3/8")	1	CWT25005 (3/8")	←	CWT25007 (1/2")	
10	DISCHARGE GRILLE COMPLETE	1	CWE20C480	←	CWE20C481	
11	MOTOR-AIR SWING	1	CWA98245	←	←	○
12	TAP-DRAIN TRAY	1	CWH52C003	←	←	
13	VANE	1	CWE24394	←	←	
14	CONTROL BOARD	1	CWH10887	←	←	
15	TERMINAL BOARD COMPLETE	1	CWA28C469	←	CWA28C470	○
16	POWER SUPPLY CORD	1	CWA20C620	←	←	
17	SLIDE SWITCH	1	CWA04088	←	←	○
18	TRANSFORMER COMPLETE	1	CWA40C246	←	←	○
19	ELETRONIC CONTROLLER	1	CWA74900	CWA74899	CWA74804	○
20	RECEIVER	1	CWA74321	←	←	○
21	INDICATOR COMPLETE	1	CWE39C271	←	←	○
22	SENSOR COMPLETE	1	CWA50C521	←	←	○
23	CONTROL BOARD TOP COVER	1	CWH13383	←	←	
24	CONTROL BOARD FRONT COVER	1	CWH13C256	←	←	
25	CONTROL BOARD COVER PIECE	1	CWH13385	←	←	
26	REMOTE CONTROL COMPLETE	1	CWA75C556	←	←	○
27	FRONT GRILLE COMPLETE	1	CWE11C590	←	←	
28	INTAKE GRILLE COMPLETE	1	CWE22C287	←	←	
29	PARTICULAR PIECE	2	CWD93C070	←	←	
30	AIR FILTER	2	CWD00215	←	←	
31	SCREW-FRONT GRILLE	2	XTN4+16C	←	←	
32	CAP-FRONT GRILLE	2	CWH52230	←	←	
33	DRAIN HOSE	1	CWH5880580	←	←	
34	OPERATING INSTRUCTIONS	1	CWF561108	←	←	
35	INSTALLATION INSTRUCTIONS	1	CWF61355	←	←	
36	INSTALLATION PLATE	1	CWH36122	←	←	
37	BAG COMPLETE-INSTALLATION SCREW	1	CWH82C144	←	←	
38	AIR PURIFYING FILTER COMPLETE	1	CWD00C111	←	←	
39	AIR PURIFYING FILTER	2	CWD00220	←	←	○

(Note) ● All parts are supplied from MACC, Malaysia (Vendor Code: 086).

- The above parts are kept for seven years in accordance with MEI service policy. However, longer lead time will be taken in supplying the non-numbered parts.
- ○ marked parts are recommended to be kept in stock.

Exploded View

CU-A70KE / CU-A90KE / CU-A120KE



Replacement Parts List

<Model: CU-A70KE / CU-A90KE / CU-A120KE>

NO.	DESCRIPTION & NAME	Q'TY	CU-A70KE	CU-A90KE	CU-A120KE	REMARKS
1	CHASSY ASS'Y	1	CWD50K438F	CWD50K456D	CWD50K612A	
2	FAN MOTOR BRACKET	1	CWD54113	←	CWD54155	
3	SCREW – FAN MOTOR BRACKET	4	CWH4580399	←	←	
4	FAN MOTOR	1	CWA95245	←	←	○
5	SCREW – FAN MOTOR MOUNT	3	CWH55027	←	←	
6	PROPELLER FAN	1	CWH00K052	←	←	
7	NUT – PROPELLER FAN	1	CWH56032	←	←	
8	COMPRESSOR	1	2RS122D5AB02	2PS164D3AD02	2KS224D5AC02	○
9	ANTI – VIBRATION BUSHING	3	CWH50077	←	CWH50055	
10	NUT – COMPRESSOR MOUNT	3	CWH56000	←	CWH4582065	
11	CONDENSER	1	CWB32C043	←	CWB32C225	
12	HOLDER COUPLING ASS'Y	1	CWH35K017A	←	CWH35K019A	
13	3-WAY VALVE	1	CWB01343	←	CWB01379	○
14	2-WAY VALVE	1	CWB02224	←	CWB02269	○
15	4-WAY VALVE	1	CWB00002	←	CWB00003	○
16	TUBE ASS'Y (RECEIVER)	1	CWT01537	←	CWT01C240	
17	STRAINER	1	CWB11025	←	←	
18	TUBE ASS'Y (CHECK VALVE, CAPILLARY)	1	CWT01C260	CWT01C257	CWT01C241	
19	V – COIL COMPLETE	1	CWA43C424	←	CWA43C439	○
20	SOUND PROOF BOARD	1	CWH15C081	←	CWH15264	
21	OVERLOAD PROTECTOR	1	CWA12304	CWA12298	CWA12300	○
22	TERMINAL COVER	1	CWH17006	CWH17038	←	
23	HOLDER – O.L.P.	1	CWH7041200	CWH34033	←	
24	NUT – TERMINAL COVER	1	CWH7080300	←	←	
25	SOUND PROOF MATERIAL	1	—	—	CWG30779	
26	SOUND PROOF MATERIAL	1	CWG30786	←	—	
27	CONTROL BOARD	1	CWH10881	←	CWH10878	
28	TERMINAL BOARD ASS'Y	1	CWA28K216	←	←	
29	CAPACITOR – COMPRESSOR	1	CWA31653	CWA31646	CWA31647	○
30	HOLDER CAPACITOR	1	CWH30057	←	←	
31	CAPACITOR – FAN MOTOR (1.2 μF, 400 V)	1	CWA31342	←	←	○
32	ELECTRO MAGNETIC SWITCH	2	CWA00059	←	←	○
33	TERMINAL BOARD ASS'Y	1	CWA4711012	←	←	
34	ELECTROLYTIC CAPACITOR	1	CWA32C045	←	←	○
35	ELECTROLYTIC CAPACITOR	1	CWA32C067	←	←	○
36	TEMPERATURE RELAY	1	CWA14C000	←	←	○
37	CABINET ASS'Y	1	CWE00K198B	←	CWE00K240B	
38	CABINET FRONT PLATE	1	CWE06C046E	←	CWE06C104A	
39	CONTROL BOARD COVER	1	CWH13302	←	←	
40	HANDLE	1	CWE16037C	←	←	

- (Note)
- All parts are supplied from MACC, Malaysia (Vendor Code: 086).
 - The above parts are kept for seven years in accordance with MEI service policy. However, longer lead time will be taken in supplying the non-numbered parts.
 - ○ marked parts are recommended to be kept in stock.

Electronic Parts List

<Model: CWA74900 / CWA74899 / CWA74804>

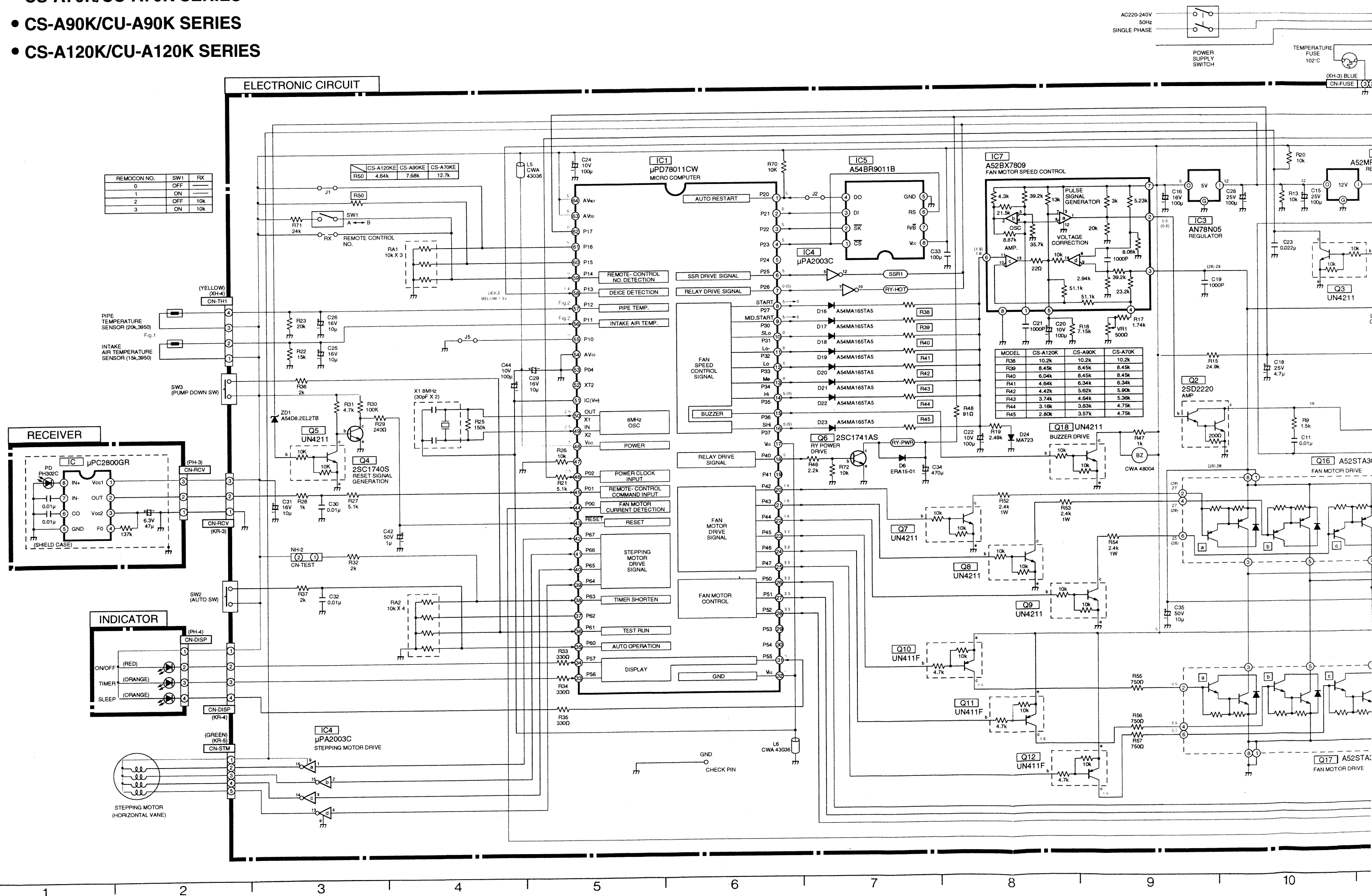
SYMBOL	DESCRIPTION & NAME	PART NO.
BZ	SOUND GENERATOR	A48004
CT1	TRANSFORMER	A40322
D1	DIODE	A54RB44-08V
D2	DIODE	A54C197
D3	DIODE	A541SS131T
D6	DIODE	A54RA15-01KB
D24	DIODE	A54MA723TA
D7 ~ D13, D15 ~ D23	DIODE	A54MA165TA5
DB1	DIODE	A54D35BA60F1
DB2	DIODE	A54CS1VB10E
FUSE	FUSE	XBA2C31TRO
IC1	INTEGRATED CIRCUIT	A52D011W164
IC2	INTEGRATED CIRCUIT	A52MPC78M12H
IC3	INTEGRATED CIRCUIT	A52C040
IC4	INTEGRATED CIRCUIT	A52MPA2003C
IC5	INTEGRATED CIRCUIT	A52BR9011B
IC6	INTEGRATED CIRCUIT	A52MPC0393C
IC7	INTEGRATED CIRCUIT	A52BX7809
L1	V-COIL	A43101T
L2 ~ L6	V-COIL	A43036
LF1	NOISE FILTER	A49184
Q1	TRANSISTOR	A55C081
Q10 ~ Q12	TRANSISTOR	A55DTA143XST
Q16	TRANSISTOR	A52STA302A
Q17	TRANSISTOR	A52STA303A
Q2	TRANSISTOR	A55D2220QTA
Q3, Q5, Q7 ~ Q9, Q13 ~ Q15, Q18	TRANSISTOR	A55DTC114EST
Q4	TRANSISTOR	A55C1740STPQ
Q6	TRANSISTOR	A55C1741ASTR
RY-HOT	ELECTRO MAGNETIC RELAY	A00161
RY-PWR	ELECTRO MAGNETIC RELAY	A00106
SSR1	TYRISTOR	A56W2DEH1-5
SW1	SLIDE SWITCH	A04042
SW2, SW3	PUSH SWITCH	A01059
T1	TRANSFORMER	A40235
T2	TRANSFORMER	A40263
VR1	VARIABLE RESISTOR	A44VG67TP152
X1	RESONATOR	A45ST8.0MTWT
ZD1	DIODE	A54D8.2EL2TB
ZNR1	DIODE	A54C036

(Note) • All parts are supplied from MACC, Malaysia (Vendor Code: 086).

MEMO

MEMO

- **CS-A70K/CU-A70K SERIES**
- **CS-A90K/CU-A90K SERIES**
- **CS-A120K/CU-A120K SERIES**



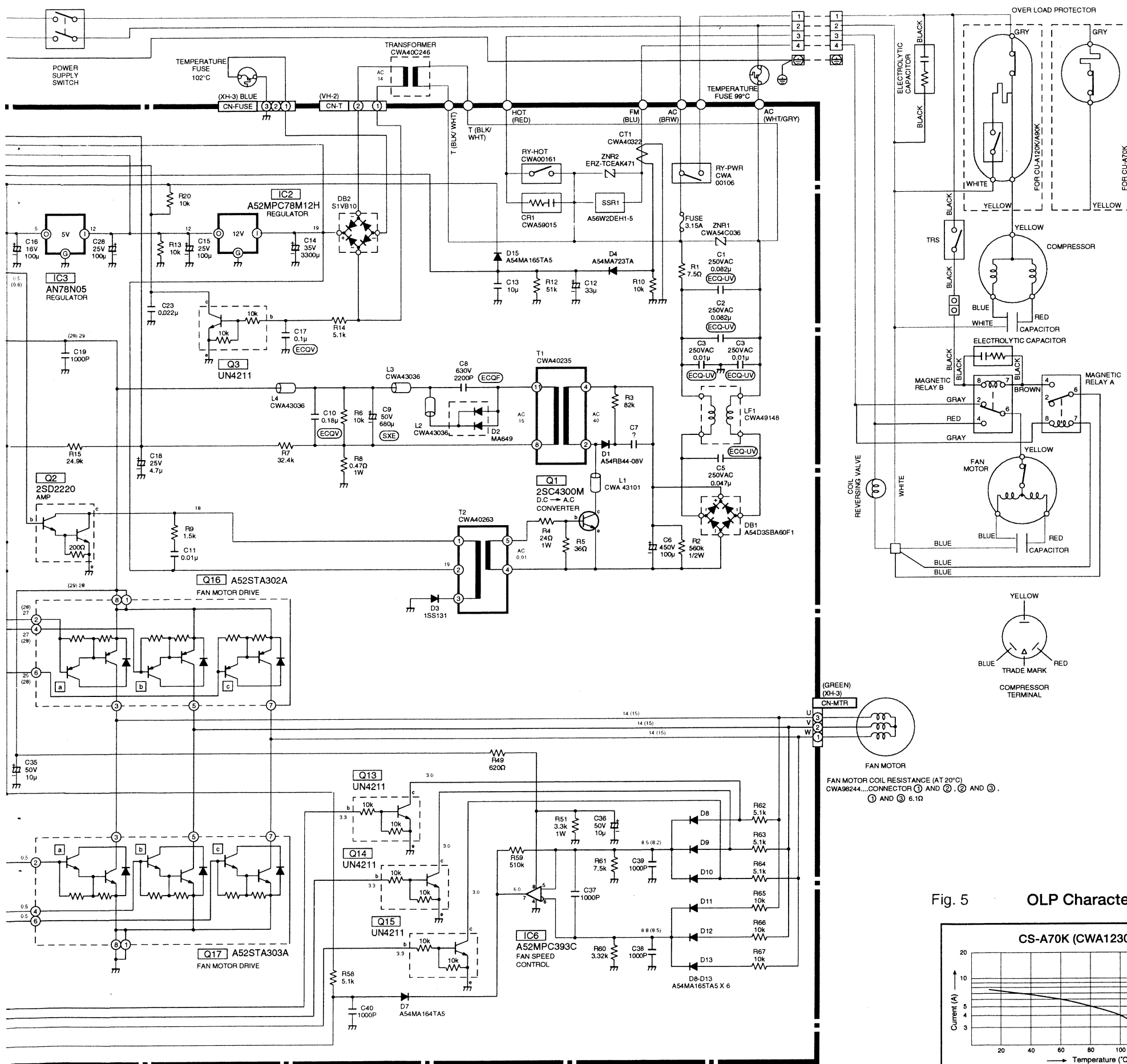


Fig. 1

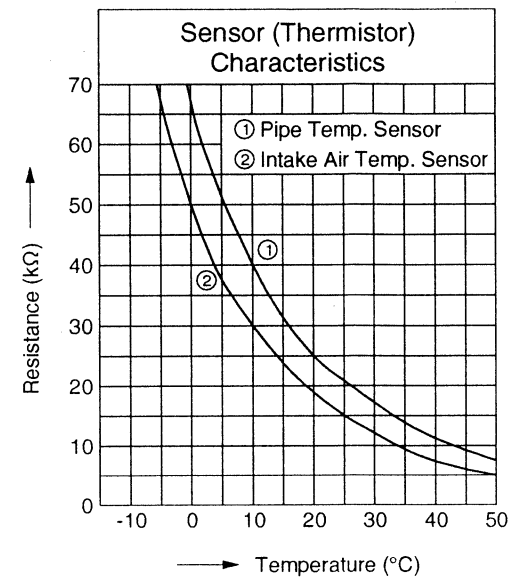


Fig. 2

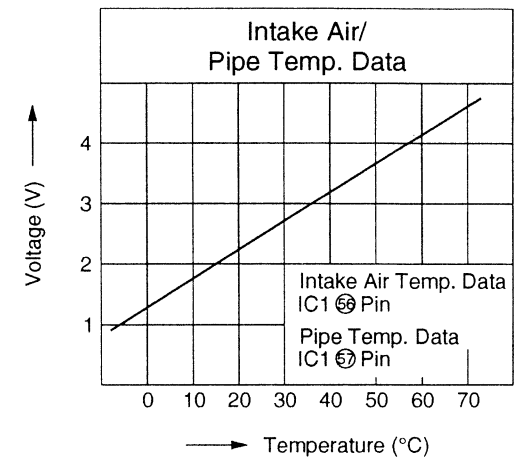


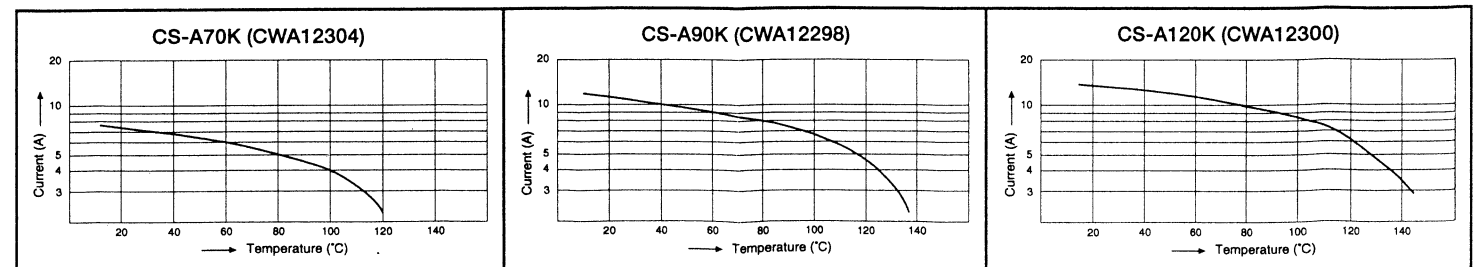
Fig. 3 Indoor Fan Speed

Fan Speed		High Speed ↔ Low Speed								
No.		8	7	6	5	4	3	2	1	0
Cooling	Manual		○	○	○					
	Auto		○	○						
	Sleep					○				
Soft Dry							○			○
Heating	Manual	○		○	○	○	○			○
	Auto			○	○	○	○			○
	Sleep					○	○			○
Voltage to Fan Motor Drive Transistor (V)	CS-A70K	21.0	21.0	18.6	17.0	15.8	11.0	11.0	7.2	0
	CS-A90K	26.7	25.9	21.5	18.1	15.8	11.0	11.0	7.2	0
	CS-A120K	32.0	31.0	26.0	22.5	21.5	16.5	11.0	7.2	0
		SHi	Hi	Me	Lo	Lo-	SLO	MID	START	STOP

Fig. 4 TRS characteristics

OPEN	4°C
CLOSE	-3°C

Fig. 5 OLP Characteristics (Compressor)



How to use electronic circuit diagram

Before using the circuit diagram, read the following carefully.

* Voltage measurement

Voltage has been measured with a digital tester when the indoor fan is set at high fan speed under the following conditions without setting the timer.

Use them for servicing.

Voltage indication is in Red at cooling and all operations.

Voltage indication is in (Red) at heating.

	Intake air temperature	Temperature setting	Discharge air temperature	Pipe temperature
Cooling	27°C	16°C	17°C	15°C
Heating	20°C	30°C	40°C	50°C

* Indications for resistance

- a. K kΩ M MΩ
W ... watt Not indicated 1/4W

b. Type

Not indicated carbon resister
Tolerance±5%
 metal oxide resister
Tolerance±1%

* Indications for capacitor

- a. Unit μ μF P pF
b. Type Not indicated ...ceramic capacitor
(S) S series aluminium electrolytic capacitor
(Z) Z series aluminium electrolytic capacitor
(SU) SU series aluminium electrolytic capacitor
(P) P series polyester system
(SXE) SXE series aluminium electrolytic capacitor
(SRA).....SRA series aluminium electrolytic capacitor
(KME).....KME series aluminium electrolytic capacitor

* Diode without indication MA165

× Circuit Diagram is subject to change without notice for further development.

TIMER TABLE

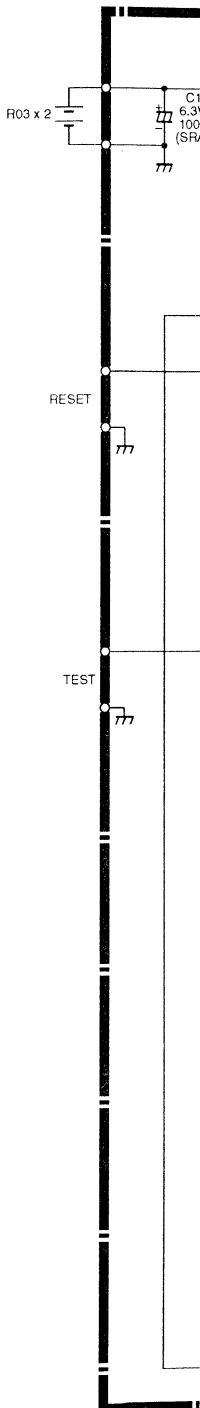
Name	Time	Test Mode (When test point Short-circuited)	Remarks
Sleep Mode Waiting	1 hr.	6 sec.	
Sleep Mode Operation	8 hrs.	48 sec.	
Real Timer	1 hr.	1 min.	
	10 min.	10 sec.	
	1 min	1 sec.	
Time Delay Safety Control	2 min. 58 sec.	0 sec.	
Forced Operation	60 sec	0 sec	
Time Save Control	7 min.	42 sec.	
Anti-Freezing Control	4 min	0 sec.	
Soft Dry Off	6 min.	36 sec.	
Indoor Fan Step Change	1 sec.	0 sec.	
Heating Operation Start	30 min.	3 sec.	
Deicing	60 min.	6 sec.	60 min. after previous Deice
	4 min.	24 sec.	Comp. ON continuously for 4 min.
	50 sec.	0 sec.	TRS ON continuously for 50 sec.
Overload Deicing	1 min.	6 sec.	Comp. ON 1 min. and above
Outdoor Fan Forced Operation	30 sec.	3 sec.	
Outdoor Fan OFF Time Accumulation	60 min.	360 sec.	
Ending of Deice Operation	12 min.	72 sec.	
After Deice Ended	30 sec.	3 sec.	Outdoor Fan ON, Compressor OFF
	10 sec.	1 sec.	4-way Valve ON
4-way Valve Control	5 min.	30sec.	

TIMER TABLE

Name		Time	Test Mode (When test point Short-circuited)	Remarks
Mode Judgement		20 sec.	0 sec.	
Deice End Judgement		60 sec.	0 sec.	
		120 sec.	0 min.	
		180 sec.	0 sec.	
TRS Recovery Detection		12 min	72 sec.	
		6 min	36 sec.	
		3 min.	18 sec	
		1 min.	6 sec.	
Hot-start-Comp. Forced ON Time		30 sec.	0 sec.	
Deodorizing Control	Cooling	40 sec.	4 sec.	Comp. ON
		70 sec.	7 sec.	Comp. ON
		20 sec.	2 sec.	Comp. OFF
	Soft Dry	180 sec.	18 sec.	Comp. OFF
		40 sec.	4 sec.	Comp. ON
		360 sec.	36 sec.	Comp. OFF
Comp. Reverse Rotation Detection		5 min.	30 sec.	Comp. ON 5 min. and above
		2 min.	0 sec.	
Comp. / Fan Motor Delay Timer		1.6 sec.	0 sec.	
Intake Air Anti-Freezing Prevention		16 min.	96 sec.	
Outdoor Fan Delay Timer		1.6 sec.	0 sec.	

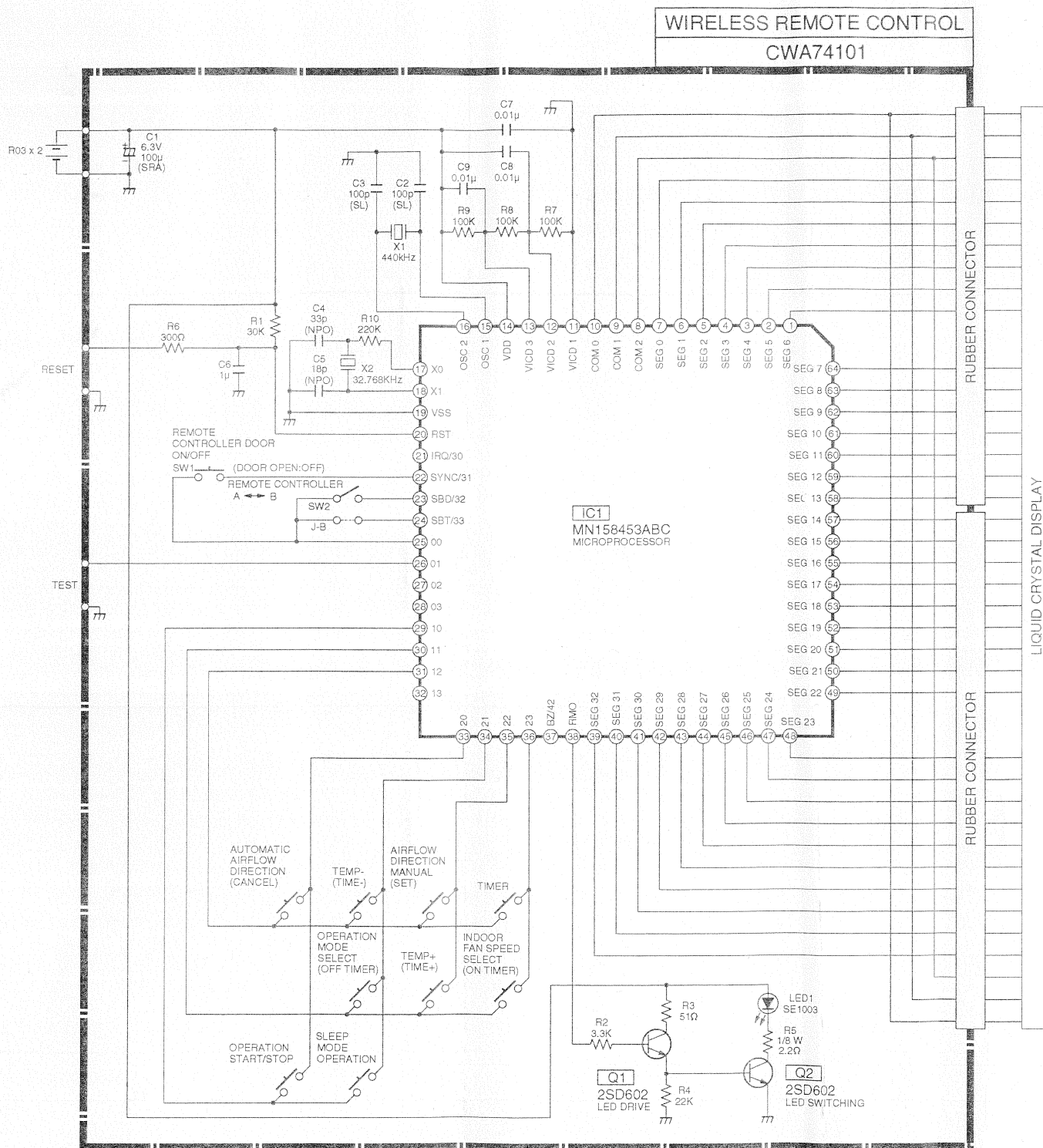
ELEC

● RE



ELECTRONIC CIRCUIT DIAGRAM

● REMOTE CONTROLLER

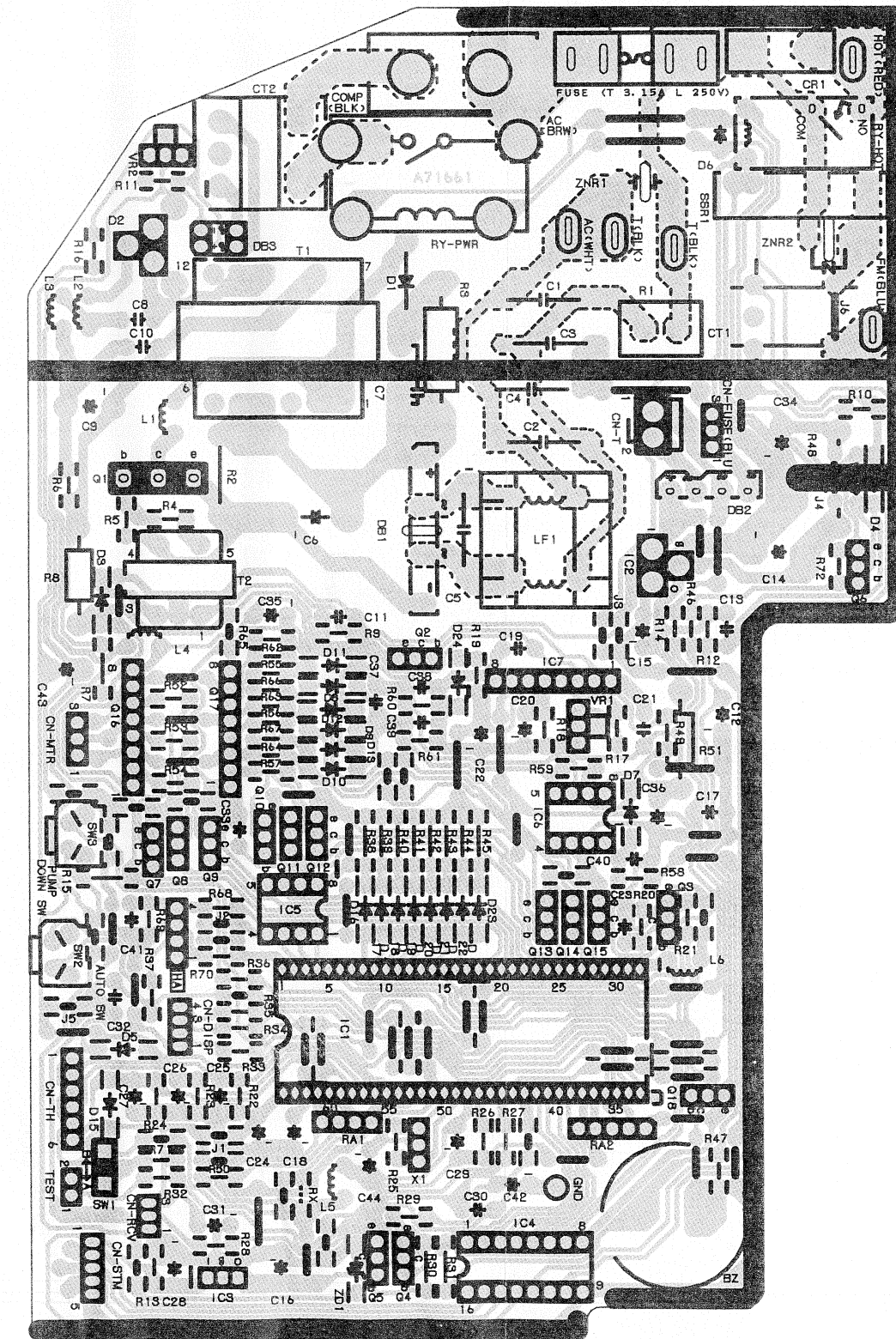


REMOTE CONTROL NO.	SW2	J-B	REMARKS
0	A	B	AT DELIVERY
1	O	-	
2	O	O	
3	O	O	

J-B: THE O MARK INDICATES "JUMPER WIRE"

PRINT PATTERN
INDOOR UNIT PRINTED CIRCUIT BOARD

● MAIN



Service Manual

ROOM AIR CONDITIONER

Supplement

**MODEL : CS/CU-A70KE
CS/CU-A90KE
CS/CU-A120KE**

WARNING

This service information is designed for experience repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Please file and use this Supplement Service Manual together with the service manual for model CS/CU-A70KE CS/CU-A90KE, CS/CU-A120KE, Order No :MAC9509078C2.

Subject: **Revision of Electronic Parts List & Wiring Diagram.**

1) Change of Fuse from **T 3.15A L250V** to **T 2.0A L 250V** and Noise Filter.

Refer to page 51 (Electronic Part List).

Model: CWA74900 / CWA74899 / CWA74804

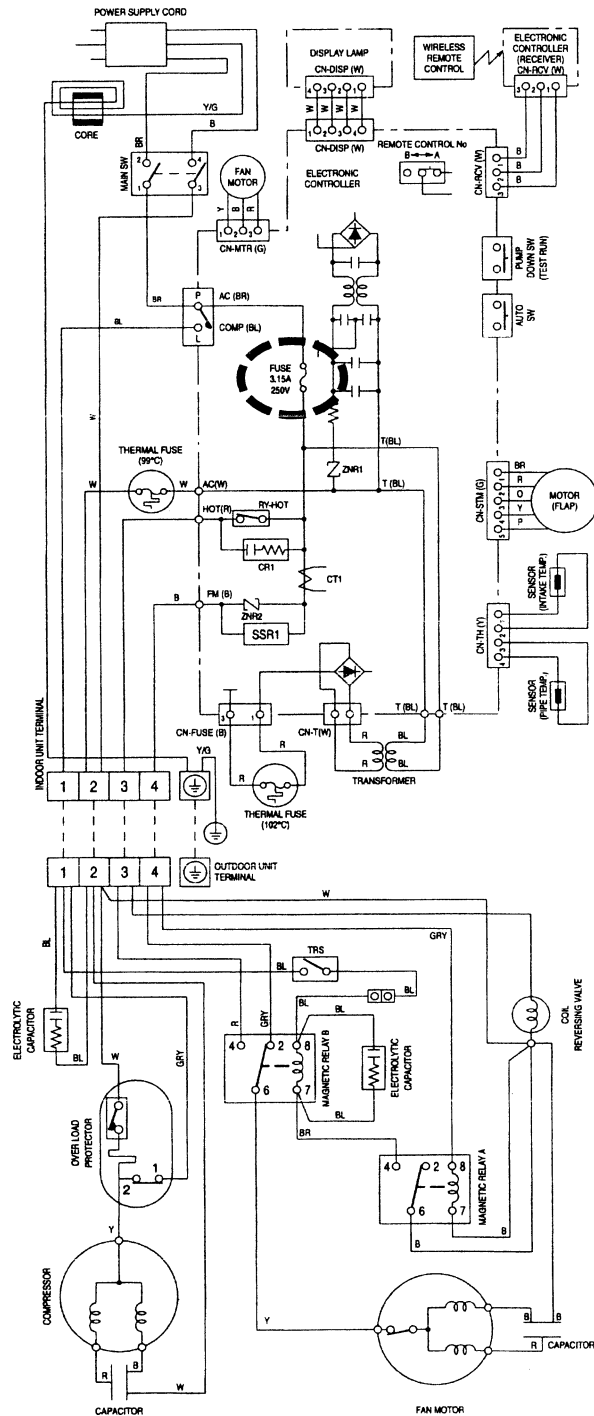
SYMBOL	DESCRIPTION & NAME	PREVIOUS PART NO.	NEW PART NO.
Fuse	Fuse	XBA2C31TRO	XBA2C20TRO
LF1	Noise Filter	A49184	A49221

2) Revised Of Wiring Diagram.

(refer to the next page).

Wiring Diagram

CS-A90KE / CU-A90KE
CS-A120KE / CU-A120KE



- REMARKS:**
- B : BLUE
 - BR : BROWN
 - BL : BLACK
 - W : WHITE
 - R : RED
 - O : ORANGE
 - P : PINK
 - Y/G : YELLOW/
GREEN
 - GRY : GRAY

Resistance of Outdoor Fan Motor Windings

CONNECTION	CWA95245 (Ω)
BLUE - YELLOW	312.9
YELLOW - RED	419.7

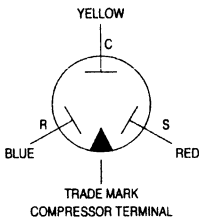
Resistance of Compressor Windings

CU-A90KR

CONNECTION	2PS164D3AD02 (Ω)
C-R	3.43
C-S	4.76

CU-A120KR

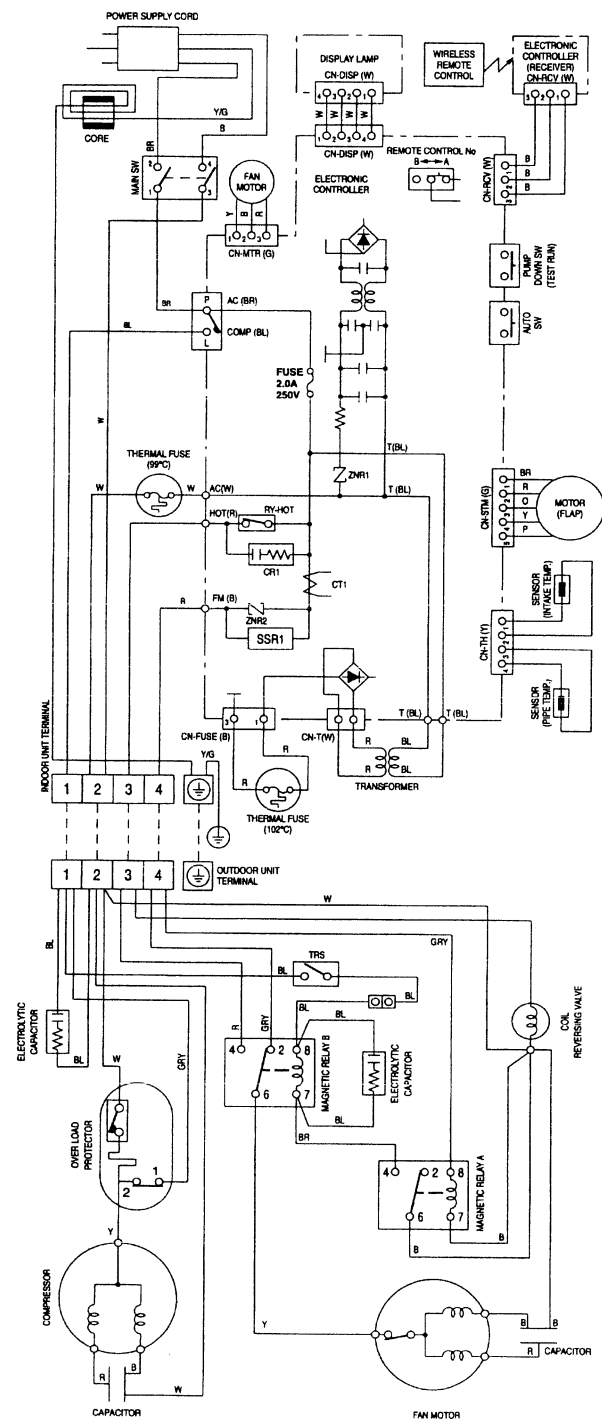
CONNECTION	2KS224D5AC02 (Ω)
C-R	2.45
C-S	3.86



New Diagram.

Wiring Diagram

CS-A90KE / CU-A90KE
CS-A120KE / CU-A120KE



- REMARKS:**
- B : BLUE
 - BR : BROWN
 - BL : BLACK
 - W : WHITE
 - R : RED
 - O : ORANGE
 - P : PINK
 - Y/G : YELLOW/ GREEN
 - GRY : GRAY

Resistance of Outdoor Fan Motor Windings

CONNECTION	CWA95245 (Ω)
BLUE - YELLOW	312.9
YELLOW - RED	419.7

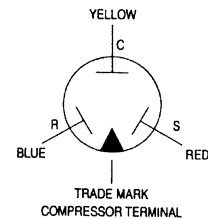
Resistance of Compressor Windings

CU-A90KR

CONNECTION	2PS164D3AD02 (Ω)
C-R	3.43
C-S	4.76

CU-A120KR

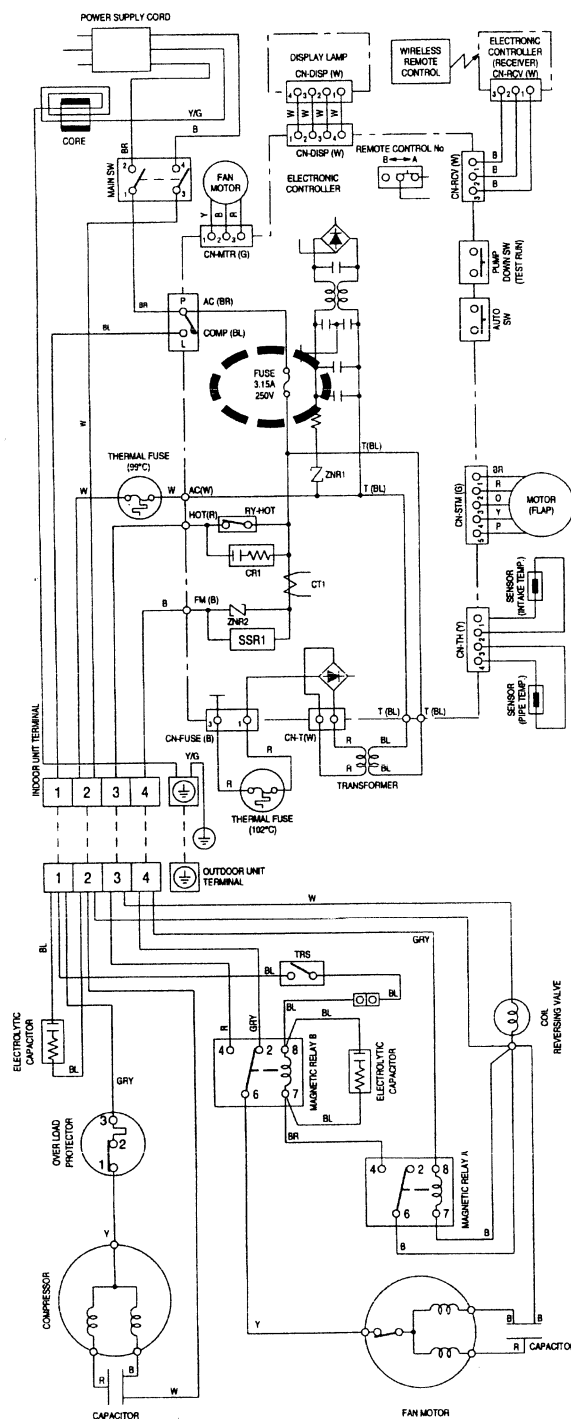
CONNECTION	2KS224D5AC02 (Ω)
C-R	2.45
C-S	3.86



Previous Diagram.
(Page : 15)

Wiring Diagram

CS-A70KE / CU-A70KE



REMARKS:

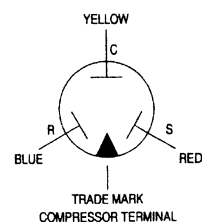
B : BLUE
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 GREEN
 GRAY : GRAY

Resistance of Outdoor Fan Motor Windings

CONNECTION	CWA95245 (Ω)
BLUE - YELLOW	312.9
YELLOW - RED	419.7

Resistance of Compressor Windings

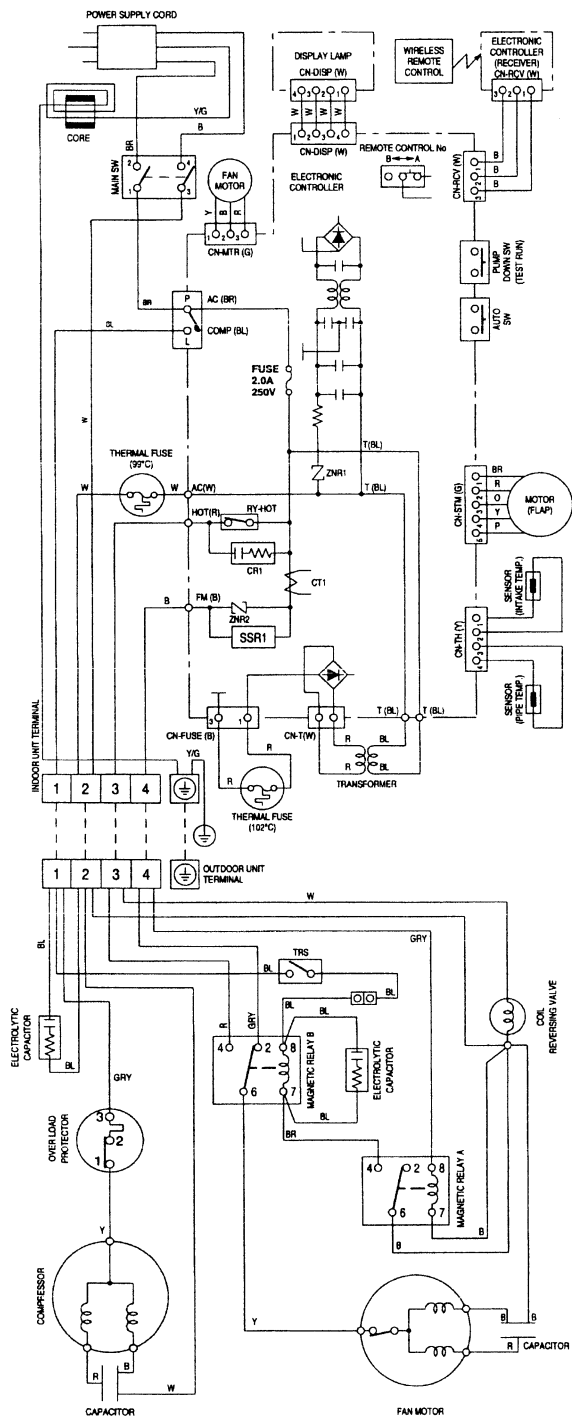
CONNECTION	2RS122D5AB02 (Ω)
C-R	5.63
C-S	12.17



New Diagram.

Wiring Diagram

CS-A70KE / CU-A70KE



- REMARKS:**
- B : BLUE
 - BR : BROWN
 - BL : BLACK
 - W : WHITE
 - R : RED
 - O : ORANGE
 - P : PINK
 - Y/G : YELLOW/ GREEN
 - GRY : GRAY

Resistance of Outdoor Fan Motor Windings

CONNECTION	CWA95245 (Ω)
BLUE - YELLOW	312.9
YELLOW - RED	419.7

Resistance of Compressor Windings

CONNECTION	2RS122D5AB02 (Ω)
C-R	5.63
C-S	12.17

